

RESEARCH NOTE 84-22

MAINTENANCE PERFORMANCE SYSTEM  
GUIDE FOR INDIVIDUAL TECHNICAL TRAINING IN DIRECT SUPPORT UNITS  
VOLUME 2: TRAINING REFERENCE INFORMATION

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## **INTRODUCTION**

### **PURPOSE OF THIS GUIDE**

This is Volume 2 of a two-volume guide that is designed to help unit leaders accomplish technical training. It is directed primarily at such company-level leaders as company commanders, senior supervisors, and first-line supervisors in their roles as training managers and trainers. Battalion training managers such as the S3 will also find much of the material in this guide useful. This guide is meant to supplement, not supersede or replace, other standard training references used by unit leaders (such as FM 25-2, FM 25-3, AR 350-1, Battalion Training Management System (BTMS) documentation, Soldier's Manuals, etc.). It consolidates much of the training information contained in many different documents and presents it in a more usable form. This guide does not present a new training method so much as a **strategy** for using existing Army training approaches and resources. The guide assumes that the reader is generally familiar with Army training doctrine, philosophy, training methodology, and resources. Given these, the guide will help the reader put the pieces together to do effective technical training in his unit.

The Maintenance Performance System (MPS) is a computer-based system for gathering and processing maintenance data in direct support maintenance battalions of mechanized and armored divisions. The processed information is provided to unit maintenance managers and trainers to help them make management and training decisions. This guide was written for units both with and without the MPS. It presents a strategy for unit-level technical training that applies equally to MPS and non-MPS units.

This guide was written because technical training has increasingly become a unit responsibility. Unit leaders cannot expect the training pipeline to provide soldiers who are fully qualified in technical MOS's. Graduates of AIT courses have received training on the basic common skills and knowledges of their MOS and in a small percentage of the technical tasks. That training prepares them for repair tasks at what is normally considered to be the "apprentice" level. The Army

estimates that the new AIT graduate has received "hands-on" training on about 15 percent of the technical tasks of his MOS. Obviously, more training is needed before the soldier is fully qualified to perform his job. Unit leaders are responsible for reinforcing the skill and knowledge training and for providing training on the remaining technical tasks.

## **OBJECTIVES OF THIS GUIDE**

This guide is designed to achieve the following objectives:

- To define the roles and responsibilities of unit-level training managers and trainers.
- To provide a strategy to accomplish unit individual technical training goals.
- To help trainers identify and assign priorities to technical training objectives.
- To provide guidance for identifying the best training approaches to meet training objectives.
- To provide detailed task, key step, and training materials information for skill levels one and two in MOS's 31E, 41C, 44B, 45B, 45K, 45L, 52D, 63G, 63H, and 63W.
- To describe planning requirements for individual technical training.
- To describe technical training evaluation requirements and guidelines.

## **HOW THIS GUIDE IS ORGANIZED**

Most of this guide is devoted to explaining the steps in the Unit Training Strategy (UTS) and the specific things that trainers and training managers must do to make it work in their units. The guide is presented in two volumes:

- Volume 1: Training Methodology
- Volume 2: Training Reference Information.

Volume 1 explains the UTS and how to apply it. Volume 2 contains reference information that supports the UTS.

Both Volumes 1 and 2 of this guide apply to you, whether or not you have the MPS. If you do not have it, you can still apply the UTS. Skip chapter sections that have "MPS" in their titles. Substitute your judgment for MPS computer printouts. If you do have the MPS, then do not skip anything in the guide. Everything applies,

including the manual records. The MPS will help you determine training objectives and their priorities accurately and painlessly. But since the MPS is designed to be part of the larger Army training system, it will not operate on its own. You must still maintain manual records on training.

#### **NOTE TO READERS WITH THE MPS**

This guide is one of four guides that have been prepared to support the MPS. The remaining three guides are:

**User's Reference Manual** — describes MPS features, operation, inputs, outputs, and calculations. A basic document that applies to all MPS users—system operators, maintenance managers, training managers, and trainers.

**Operator's Manual** — describes methods and procedures for MPS operators to operate and maintain the MPS, including data collection, data entry, quality control, and report generation.

**Interpretation Booklet** — summarizes report interpretation information contained in the Reference Manual. Applies to maintenance managers and trainers.



## **APPENDIX A**

### **TRAINING CHECKLISTS**

This appendix consolidates the training checklists contained at the ends of Chapters 3 through 8 of Volume 1 of this guide. Each checklist corresponds to one step of the Unit Training Strategy (UTS), as described in the accompanying chapter of Volume 1. You should be thoroughly familiar with the material in Volume 1 before attempting to use the checklists.

The checklists are presented in the following order:

- STEP ONE: ESTABLISH AND MAINTAIN RECORDS.**
- STEP TWO: IDENTIFY TRAINING OBJECTIVES.**
- STEP THREE: SET TRAINING PRIORITIES.**
- STEP FOUR: SELECT TRAINING APPROACHES.**
- STEP FIVE: PLAN AND CONDUCT TRAINING.**
- STEP SIX: EVALUATE TRAINING.**

## **TRAINING CHECKLIST**

### **STEP ONE: ESTABLISH AND MAINTAIN RECORDS**

This checklist will help trainers and training managers identify the specific tasks they must perform to accomplish this step of the Unit Training Strategy. The trainer is responsible for performing these tasks, unless otherwise indicated. Training managers are responsible for periodically spot-checking to assure that these tasks are being performed adequately. Training managers are also responsible for coordinating with trainers, as indicated below, and for providing the resources trainers will need to take the actions specified.

#### **JOB BOOKS**

- Establish Job Books for all personnel you supervise in pay grades E1-E5.
- Establish Job Books as new soldiers come under your supervision.
- If you are transferred, or change jobs, give Job Books to your replacement.
- When a soldier leaves the unit, give his Job Book to him or to his new supervisor, as directed by your commander.
- Update Job Books whenever any of the following events occurs:
  1. After training, to reflect increased skills that have been gained through training.
  2. After taking the SQT or other performance test, to reflect test results.
  3. After observing a soldier on the job, when he has demonstrated mastery of new skills.
- Periodically spot check Job Books maintained by your subordinates to assure they are kept up to date.

#### **MPS RECORDS**

- Assure that MPS-2 (Job Performance) form is completed and submitted to MPS operator for each MPS task performed by your section.

- Check MPS roster every two weeks to assure that it is up to date for the MOS's you supervise (that it lists all new soldiers and does not list soldiers who have departed); if not up to date, check with MPS operator.
- Complete MPS-5 (Training/Performance Demonstration) each time a training or testing event occurs. Refer to Volume 1, Appendix A, for details.
- Assure that MPS-6 (Task Experience History) is completed by each new soldier. MPS operator should request this history. If he does not, then initiate action. ("N" will appear opposite soldier's name on roster if MPS-6 has not been completed.)
- Complete MPS-7 (Special Priority Flag) for tasks that you and training manager want to assign special or null priorities to. Refer to Volume 1, Appendix A, for details.
- Complete MPS-9 (Training Requirement Priority Threshold) to increase or decrease the number of training requirements appearing on Table 9. Refer to Volume 1, Appendix A, for details.
- Check each set of training reports (Tables 6-9) for accuracy:
  1. Review skill and growth indexes on Tables 6 and 7.
  2. Assure that you are receiving Table 8's for all soldiers you supervise, and none for those who have left.
  3. Review Table 9 accuracy through Tables 6-8--if Tables 6-8 are accurate, then Table 9 will be accurate.

### **TRAINER'S NOTEBOOK**

- Establish a Trainer's Notebook for each MOS that you supervise.
- Use a two-inch, three-ring binder with dividers for the following sections:
  - Section 1: Roster of personnel in MOS.
  - Section 2: List of training objectives.
  - Section 3: Training plan.
  - Section 4: Observer's log.
  - Section 5: Working notes.
  - Section 6: Copy of current and next-most-recent MPS printouts of Tables 6, 7, 8, 9, and 3 (if unit has MPS).
  - Section 7: Evaluation notes
- Maintain notebook according to procedures given in Chapters 4-8 of Volume 1.

## **TRAINING CHECKLIST**

### **STEP TWO: IDENTIFY TRAINING OBJECTIVES**

This checklist will help trainers and training managers identify the specific tasks they must perform to accomplish this step of the Unit Training Strategy. The trainer is responsible for performing these tasks, unless otherwise indicated. Training managers are responsible for periodically spot-checking to assure that these tasks are being performed adequately. Training managers are also responsible for coordinating with trainers, as indicated below, and for providing the resources trainers will need to take the actions specified.

#### **INFORMAL ANALYSES**

- Review and study Soldier's Manual technical tasks for all MOS's you supervise.
- Relate Soldier's Manual tasks to work done in shop:
  1. Determine which tasks are performed frequently, rarely, and never.
  2. Assess soldier's proficiency on tasks.
- Assure that all first-line supervisors are familiar with Soldier's Manual tasks.
- Assure all first-line supervisors are informed regarding proficiency of subordinates on Soldier's Manual tasks.
- Make notes on task frequency and soldier proficiency for inclusion in Section 4 of your Trainer's Notebook.
- Identify tasks performed in your shop that are not included in Soldier's Manual and make a list of them for inclusion in section 5 of your Trainer's Notebook.
- Use Trainer's Notebook Section 5 to keep track of events that occur in your shop that signify that training objectives exist. These events include:
  1. Observation of incorrect maintenance procedures, errors, non-use of technical manuals, use of improper tools, excessive time, damage during maintenance, etc.
  2. First-line supervisor reports of subordinate lack of proficiency.

- Use Trainer's Notebook Section 5 to keep track of tasks on which training is needed and personnel involved.
- Make Trainer's Notebook entries daily.
- Make up preliminary list of training objectives over a period of about a week:
  1. Observe repairmen at work.
  2. Talk to first-line supervisors.
  3. Talk to repairmen.
  4. Do not limit number of tasks or attempt to order in terms of importance.
  5. Keep preliminary list in Section 4 of Trainer's Notebook.

#### **FORMAL ANALYSES**

- Compile Job Book information (or have first-line supervisors compile) in matrix and tally "NO-GO's" as described in Chapter 4.
- Maintain NO-GO summary in section 5 of Trainer's Notebook.
- Review SQT results and identify tasks on which training is needed. Record in Section 5 of Trainer's Notebook.
- Review MPS Table 9 to identify MPS training objectives. Record in Section 5 of Trainer's Notebook.

#### **DEVELOP COMBINED TRAINING OBJECTIVES LIST**

- Develop combined list of training objectives based on:
  1. Job Book NO-GO summary.
  2. Unit-unique tasks you have noted.
  3. MPS Table 9 tasks.
- Keep list in Section 5 of Trainer's Notebook.

## **TRAINING CHECKLIST**

### **STEP THREE: SET TRAINING PRIORITIES**

This checklist will help trainers and training managers identify the specific tasks they must perform to accomplish this step of the Unit Training Strategy. The trainer is responsible for performing these tasks, unless otherwise indicated. Training managers are responsible for periodically spot-checking to assure that these tasks are being performed adequately. Training managers are also responsible for coordinating with trainers, as indicated below, and for providing the resources trainers will need to take the actions specified.

#### **REVIEW MPS PRIORITIES**

- Review MPS priorities:
  1. Identify highest priority (1) tasks.
  2. Identify lower-priority tasks.
  3. Identify special-priority(S) tasks.

#### **REFINE PRIORITIES**

- Organize master list into different sections according to equipment type.
- Organize training objectives within equipment/task categories according to task relationships (tasks usually performed at the same time).
- Transfer MPS Table 9 priorities to training objectives on master list
- Consider NO-GO analysis and assign priorities between 1 and 7 to Soldier's Manual tasks on master list.
- Transfer Soldier's Manual task priorities to training objectives on master list.
- Assign subjective priorities to unit-unique tasks based on number of people needing training and average skill level.

- **Revise priorities of tasks on master list by taking into account subjective factors:**

1. **Equipment type (combat mission importance to customer unit).**
2. **Task frequency, difficulty, combat criticality.**
3. **Unit-unique factors.**

- **Revise master list:**

1. **Drop training objectives with low priorities.**
2. **Reduce list to manageable number of training objectives (can be handled in six weeks).**
3. **Have revised master list typed.**
4. **Post on bulletin board.**
5. **Put copy in section 2 of Trainer's Notebook.**

#### **UPDATE TRAINING OBJECTIVES PERIODICALLY**

- **Update list of training objectives, as described above, every six weeks.**
- **Perform new training objectives analysis from scratch quarterly.**

## **TRAINING CHECKLIST**

### **STEP FOUR: SELECT TRAINING APPROACHES**

This checklist will help trainers and training managers identify the specific tasks they must perform to accomplish this step of the Unit Training Strategy. The trainer is responsible for performing these tasks, unless otherwise indicated. Training managers are responsible for periodically spot-checking to assure that these tasks are being performed adequately. Training managers are also responsible for coordinating with trainers, as indicated below, and for providing the resources trainers will need to take the actions specified.

#### **GENERAL GUIDELINES**

- Training manager must set policy by defining what training resources and time are available to trainer.
- Meet with training manager at least once every six weeks to discuss training approaches.
- Use hands-on training approaches to develop hands-on skills.
- Precede hands-on training with instruction to develop underlying knowledge.
- Consider training objective groupings--use more elaborate training approaches to satisfy large group of training objectives.
- Consider group size--use more elaborate training for larger groups, less elaborate for smaller groups.
- Consider available training resources--personnel, materials, equipment, facilities, time.
- Consider training constraints--personal turbulence, diversion of personnel, training resources, time, mission priority.



- Follow these general rules:
  1. Use several training approaches, not just one or two.
  2. Do majority of training (50-70 percent) with on-the-job approaches (OJE, SOJT, SPAS ETM).
  3. Do formal training on difficult and critical MOS tasks, and on tasks on which many personnel need to gain proficiency quickly.
  4. Make full use of on-post schools.
  5. Approximately ten percent of personnel should be engaged in correspondence courses.
  6. Assure that all personnel use such self-study materials as Training Extension Courses and technical literature.
- Review Volume 1, Appendix B, for training approach descriptions, decision factors, and general guidelines for use.

## **TRAINING CHECKLIST**

### **STEP FIVE: PLAN AND CONDUCT TRAINING**

This checklist will help trainers and training managers identify the specific tasks they must perform to accomplish this step of the Unit Training Strategy. The trainer is responsible for performing these tasks, unless otherwise indicated. Training managers are responsible for periodically spot-checking to assure that these tasks are being performed adequately. Training managers are also responsible for coordinating with trainers, as indicated below, and for providing the resources trainers will need to take the actions specified.

#### **DEVELOP TRAINING PLAN**

- Battalion training managers must establish technical training policy that identifies technical training tasks, establishes priorities, designates personnel responsible for training, and states how the program will be evaluated.
- Develop individual technical training plan every six weeks that identifies:
  1. Training objectives.
  2. Related training approaches.
  3. Personnel participating in training--trainees, instructors, subject-matter experts.
  4. Schedule of training events--projected beginning and end dates, and any key events that may occur in between, such as tests.
  5. Training resources required.
  6. Method of evaluating trainee performance after training.
- Integrate individual technical training plan with battalion long-range plan:
  1. Obtain copy of battalion long-range plan.
  2. Review plan.
  3. Resolve scheduling conflicts.
  4. Schedule individual technical training to fill gaps.
- Develop short-range individual technical training plan at beginning of each week that covers dates and times of training events.

- Conduct training according to plan, if possible, but be flexible and expect departures from plan--then fit training into free time.

- Plan refresher training:

1. Cover both basic and advanced skills.
2. Cycle through program every six months to year, depending upon number of personnel and turnover rate.

## **TRAINING CHECKLIST**

### **STEP SIX: EVALUATE TRAINING**

This checklist will help trainers and training managers identify the specific tasks they must perform to accomplish this step of the Unit Training Strategy. The trainer is responsible for performing these tasks, unless otherwise indicated. Training managers are responsible for periodically spot-checking to assure that these tasks are being performed adequately. Training managers are also responsible for coordinating with trainers, as indicated below, and for providing the resources trainers will need to take the actions specified.

#### **PERFORM PRODUCT EVALUATION**

- Evaluate work performance in shop:
  1. Are personnel able to perform tasks more quickly?
  2. Are personnel able to perform tasks more accurately?
  3. Has the quality of shop work improved?
- Evaluate work performance based on observation of everyday work in shop and by gathering opinions from maintenance technicians, first-line supervisors, and contacts in customer units.
- Keep track of evaluation notes in Section 7 (Evaluation Notes) of your Trainer's Notebook.

#### **PERFORM PROCESS EVALUATION**

- Evaluate record maintenance:
  1. Check accuracy and completeness of Job Books.
  2. For MPS units, check accuracy and completeness of MPS forms 2, 4, 5, and 6.
- Evaluate training objective identification process:
  1. All trainers should be familiar with Soldier's Manual tasks for their subordinates.
  2. Training managers/trainers should revise training objectives lists every six weeks and develop new lists at least quarterly.
  3. Trainers should record training information in their Trainer's Notebooks.

4. Training objectives should agree with common-sense judgments of areas in which training is needed.

- Evaluate use of various available training approaches:

1. Several training approaches should be in use, not just one or two.
2. Majority of training--50-70 percent--should be done with combination of on-the-job approaches such as OJE, SOJT, and SPAS ETM.
3. Formal training should occur on difficult and critical tasks and on tasks for which skills need rapid improvement.
4. At least 10 percent of personnel should be engaged in correspondence courses.
5. Self-study materials such as Training Extension Courses and technical literature should be regularly used.

- Evaluate planning:

1. Short-range plan should permit allocation of training resources two weeks in advance, determine how training objectives are being satisfied, permit control of training, and training evaluation.

- Evaluate testing:

1. Some form of test should be associated with each training approach.
2. Written tests, if provided with training materials, should be used.
3. Performance tests should be used in preference to written tests, if available.
4. At least 50 percent of training objectives should be satisfied during each six-week interval.

- If unit has the MPS, then MPS Tables 6 (Skill and Growth Indexes) and 7 (Skill Development Summary) should indicate that training is occurring:

1. MPS Table 6 should show some of these characteristics:
  - Average skill index about 70 percent.
  - Growth index should range between two and five percent and be higher for inexperienced soldiers than for more experienced ones.
2. Table 7 factors:
  - Skill and growth indexes should be as noted for Table 6, above.
  - Training index and performance index should be greater than two percent.

- Each soldier should have a copy of his Table 8 (Individual Skill History).

## APPENDIX B

### TASK TRAINING MATERIALS AND KEY STEPS

#### INTRODUCTION

This appendix is divided into nine sections—one section for each MOS category covered by the MPS. Each section has two parts: (1) a matrix that identifies the training materials that can be used for training on each task, and (2) a listing of the key steps that must be performed/measured on each task. MOS categories are covered in this appendix in the following order: 31E, 41C, 44B, 45B, 45K/45L, 52D, 63G, 63H and 63W.

#### PART ONE: TASK/TRAINING MATERIALS MATRIX

MPS tasks for the MOS are listed on the left side of the matrix, and training materials useful in training those tasks are listed across the top. Marks in the boxes show which training materials apply to each task. To read the matrix, apply the same rules you do to map reading—"read right, up." For each task, read right across the matrix to the boxes marked by dots, then up to find the identifying number and type of material that applies to training on that task.

To more fully identify the training material, look up the number in Appendix C of this guide. To obtain the full title, if needed for requisition purposes, check the appropriate DA pamphlet, also listed in Appendix C, or ask your unit training NCO or the NCOIC of your unit learning center.

All training materials listed are available throughout the Army, regardless of location. There may also be other training materials available locally. If so, identify and use them as well. You may also have the resources and skills to develop training materials more applicable to your needs.

Use of these training materials will save you time and effort when developing and preparing training. However, these materials are only aids to training. Effective training will never be accomplished merely by sitting a soldier down in front of a machine, turning the machine on, and letting the soldier watch. There must be commitment, personal involvement, and "hands-on" experience in order for training to be effective.

## **PART TWO: MPS TASKS AND KEY STEPS**

Each MOS section lists MPS tasks, by equipment, and key steps to perform those tasks. The task listing follows the training materials matrix.

The listing of key steps defines (1) what work is included, and (2) what must be trained/measured in a repairman's performance of that task. The key steps follow the same sequence and use the same terminology as in the duty position task section of a Soldier's Manual. (In some Soldier's Manuals, key steps are called "performance measures.")

The number of the corresponding Soldier's Manual task (if any) appears below the MPS task as (SM XXX-XXX-XXX). As an example, the MPS task listing for MOS 63H shows:

M60 Family  
MPS Task

1. Replace engine/transmission (split pack)  
(SM 091-478-1001)

However, MPS covers only forward support companies in divisional maintenance battalions of mechanized and armored divisions. Many Soldier's Manuals tasks are for equipment not supported or for work not done by personnel in forward support companies, or the tasks are not done often enough to be covered by MPS. Some MPS tasks are done frequently by personnel in forward support companies but are not included as "critical tasks" in Soldier's Manuals. You must still refer to the Soldier's Manuals for training on those critical technical tasks not listed in the MPS.

# TRAINING MATERIALS

## TRAINING MATERIALS FOR MPS TASKS—MOS 31E

### TASKS BY EQUIPMENT

RT-246/524, R-442

TRAINING MATERIALS FOR MPS TASKS—MOS 31E		TASKS BY EQUIPMENT RT-246/524, R-442		FM		TECHNICAL MANUALS		TB	TEC LESSONS																																								
		11-31E/CM	11-31E1/2	11-600-2	11-5820-401-12	11-5820-401-34/2	11-5820-401-34/3	11-6625-200-15	11-6625-255-14	11-6625-320-12	11-6625-366-15	11-6625-446-15	11-6625-586-12	11-6625-700-10	11-6625-1703-15	11-6625-2725-14	SIG 222	101-113-4717	101-113-4720	101-113-4723	101-113-4726	101-113-4728	101-113-4735	101-113-4738	101-113-4741	101-113-4744	101-113-4747	101-113-4750	101-113-4753	101-113-4756	101-113-4759	101-113-4762	101-113-4765	101-113-4768	101-113-4771	101-113-4772	101-113-4773	101-113-4775	101-113-4776	101-113-4777	101-113-4778	101-113-4779	101-113-4780	101-113-7145	101-113-7147	101-113-7164			
1	Align driver A6100 and power amplifier A6200 (RT)	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
2	Align servosystem (RT-246)	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
3	Align IF receiver A4000	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
4	Align VHF tuner A1000	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
5	Adjust audio squelch A5000	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
6	Perform prealignment check of driver and power amplifier	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
7	Align master oscillator A6300 and buffer amplifier A6400	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
8	Replace modules in receiver, R-442	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
9	Replace modules in receiver-transmitter, RT-246/524	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
10	Replace parts in front panel assembly	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
11	Replace interconnecting module cables	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•





# TRAINING MATERIALS

## TRAINING MATERIALS FOR MPS TASKS—MOS 31E

### TASKS BY EQUIPMENT

#### PRC-77

	FM	TECHNICAL MANUALS	TB	TEC LESSONS	VTRS	CORR. CRSE.
1 Align PRC-77	11-31E/CM	11-668 11-5805-201-12 11-5805-201-35 11-5820-677-12 11-5820-677-35 11-5820-677-12 11-5820-677-35 11-6625-200-15 11-6625-366-15 11-6625-524-14-2 11-6625-586-12	SIG 222	101-113-4775 101-113-4776 101-113-4777 101-113-4778 101-113-4779 101-113-4780 101-113-7120	101-113-0047 101-113-0085 101-113-0106 101-113-0107 101-113-0109 101-113-0625 101-113-0626 101-113-0627 101-113-0628	SS9 445 SS9 448 SS9 449
2 Replace modules	•	•	•	•	•	•
3 Repair wiring	•	•	•	•	•	•
4 Replace power plug	•	•	•	•	•	•
5 Replace antenna connector	•	•	•	•	•	•
6 Adjust squelch assembly	•	•	•	•	•	•
CVC						
1 Replace cards						
2 Replace microphone boom						
3 Replace earphone						
4 Repair wiring						
TA312						
1 Replace receiver amplifier	•	•				
2 Replace buzzer	•	•				
3 Replace handset	•	•				

# TRAINING MATERIALS

## TRAINING MATERIALS FOR

### MP5 TASKS—MOS 31E

### TASKS BY EQUIPMENT

#### AN/GRA 39

	FM	TECHNICAL MANUALS	TB	TEC	VTRS	CORR. CRSE.
	11-31E/CM	11-5820-401-30-4 11-5820-401-35-1 11-5820-401-35-4 11-5820-401-35-6 11-5820-401-35-7 11-5820-401-35-8 11-5820-477-12 11-5820-477-35 11-5830-340-12 11-6625-255-14 11-6625-320-12 11-6625-366-15 11-6625-2725-14	SIG 222	101-113-4775 101-113-4776 101-113-4777 101-113-7167	101-113-0091 101-113-0092 101-113-0093 101-113-0094 101-113-0095 101-113-0104 101-113-0105 101-113-0621 101-113-0622 101-113-0623 101-113-0624	SS9 443 SS9 444 SS9 448
1 Replace buzzer	•	•	•	•	•	•
2 Replace battery box	•	•	•	•	•	•
3 Replace cards	•	•	•	•	•	•
4 Replace module	•	•	•	•	•	•
5 Replace audio plugs	•	•	•	•	•	•
6 Repair wiring	•	•	•	•	•	•
C-2796/11819						
1 Replace audio plug	•	•	•	•	•	•
2 Replace volume control	•	•	•	•	•	•
3 Replace module	•	•	•	•	•	•
4 Repair wiring	•	•	•	•	•	•
AM-1780						
1 Replace module	•	•	•	•	•	•
2 Repair wiring	•	•	•	•	•	•

## MPS TASKS AND KEY STEPS BY EQUIPMENT FOR MOS 31E

### RT-246/524, R-442

MPS Task	Key Steps
1. ALIGN DRIVER A6100 AND POWER AMPLIFIER A6200 (RT) (SM 113-587-8001)	a. Connect test equipment b. Driver A6100: Align at 30.00 MHz Align at 52.90 MHz Repeak at 30.00 MHz Align at 53.10 MHz Align at 75.85 MHz c. Power Amplifier A6200: Align at 52.90 MHz Align at 30.00 MHz Adjust on 75.90 MHz band Align at 53.00 MHz Check 30-75 MHz band d. Disconnect test equipment
2. ALIGN SERVOSYSTEM (RT-246) (SM 113-587-8002)	a. Check A9000 power supply b. Align servosystem
3. ALIGN IF RECEIVER A4000 (SM 113-587-8003)	a. Align discrimination stage b. Adjust audio and squelch preamp A4300
4. ALIGN VHF TUNER A1000 (SM 113-587-8004)	a. Function check crystal reference system b. Function check and adjust assembly A1500 c. Align receiver modules A1100, A1200, and A1300
5. ADJUST AUDIO SQUELCH A5000 (SM 113-587-8005)	a. Adjust 150 Hz circuit b. Adjust new squelch sensitivity c. Adjust old squelch circuits
6. PERFORM PREALIGNMENT CHECK OF DRIVER AND POWER AMPLIFIER (RT) (SM 113-587-8006)	a. Check power supply A9000 and A9400 b. Perform frequency test and adjustment on A8100 c. Adjust 150 Hz squelch tone transmit deviation

7. ALIGN MASTER OSCILLATOR  
A6300 AND BUFFER AMPLIFIER  
A6400 (RT)  
(SM 113-587-8007)
  - a. Align master oscillator and buffer amplifier on A band
  - b. Align master oscillator and buffer amplifier on B band
8. REPLACE MODULES IN RECEIVER,  
R-442  
(SM 113-587-4013)
  - a. Identify defective component
  - b. Disassemble receiver
  - c. Perform required unsoldering
  - d. Remove module
  - e. Install replacement
  - f. Perform required soldering
  - g. Align/adjust as needed
  - h. Assemble receiver
  - i. Test operation
9. REPLACE MODULES IN RECEIVER-  
TRANSMITTER, RT-246/524  
(SM 13-587-4005  
SM 13-587-4008)
  - a. Identify defective component
  - b. Disassemble receiver-transmitter
  - c. Perform required unsoldering
  - d. Remove defective module
  - e. Perform required soldering
  - f. Align/adjust as needed
  - g. Assemble receiver-transmitter
  - h. Test operation
10. REPLACE PARTS IN FRONT PANEL  
ASSEMBLY
  - a. Remove front panel
  - b. Replace as needed:  
Volume control  
Antenna connector  
Antenna relay
  - c. Install front panel
11. REPLACE INTERCONNECTING MODULE  
CABLES
  - a. Remove faulty cable
  - b. Install replacement

#### **AM/GRA 39**

1. REPLACE BUZZER
  - a. Remove buzzer
  - b. Install replacement
2. REPLACE BATTERY BOX
  - a. Disconnect leads
  - b. Remove battery box
  - c. Install replacement
  - d. Connect leads

3. REPLACE CORDS

- a. Remove cord
- b. Install replacement

4. REPLACE MODULE  
(SM 113-622-4001)

- a. Identify defective component
- b. Disassemble control group
- c. Perform required unsoldering
- d. Remove defective component
- e. Install replacement
- f. Perform required soldering
- g. Assemble control group
- h. Test operation

5. REPLACE AUDIO PLUGS

- a. Remove plug
- b. Install replacement

6. REPAIR WIRING

- a. Identify defective wiring
- b. Disconnect wiring and repair/replace it
- c. Connect and test

**C-2296/7/8/9**

1. REPLACE AUDIO PLUG

- a. Remove plug
- b. Install replacement

2. REPLACE VOLUME CONTROL

- a. Disassemble control unit
- b. Remove volume control
- c. Install replacement
- d. Assemble control unit

3. REPLACE MODULE  
(SM 113-587-0018  
SM 113-587-4019)

- a. Identify defective component
- b. Disassemble control unit
- c. Perform required unsoldering
- d. Remove module
- e. Install replacement
- f. Perform required soldering
- g. Assemble control unit
- h. Test operation

4. REPAIR WIRING

- a. Identify defective wiring
- b. Disconnect wiring and repair/replace it
- c. Connect and test

**AM-1780**

1. REPLACE MODULE  
(SM 113-587-4018)

- a. Identify defective component
- b. Disassemble amplifier
- c. Perform required unsoldering

## REPLACE MODULE (CONTINUED)

- d. Remove module
- e. Install replacement
- f. Perform required soldering
- g. Assemble amplifier
- h. Test operation

## 2. REPAIR WIRING

- a. Identify defective wiring
- b. Disconnect wiring and repair/replace it
- c. Connect and test

## PRC-77

### 1 ALIGN PRC-77

- a. Remove from case
- b. Check receive frequency
- c. Adjust power output
- d. Align A32-A34, A36, A38, A39
- e. Install in case

### 2 REPLACE MODULES SM 113-587-4009)

- a. Identify defective component
- b. Disassemble set
- c. Perform required unsoldering
- d. Remove defective module
- e. Install replacement
- f. Perform required soldering
- g. Assemble set
- h. Test operation

### 3 REPAIR WIRING

- a. Identify defective wiring
- b. Disconnect wiring and repair/replace it
- c. Connect and test

### 4 REPLACE POWER PLUG

- a. Remove defective plug
- b. Install replacement

### 5 REPLACE ANTENNA CONNECTOR

- a. Remove defective connector
- b. Install replacement

### 6 ADJUST SQUELCH ASSEMBLY

- a. Adjust A45, A44
- b. Adjust A22, A23

## CVC

### 1 REPLACE CORDS

- a. Remove defective cord
- b. Install replacement

### 2 REPLACE MICROPHONE BOOM

- a. Remove defective boom
- b. Install replacement

3 REPLACE EARPHONE

- a. Remove defective earphone
- b. Install replacement

4 REPAIR WIRING

- a. Identify defective wiring
- b. Disconnect wiring and repair/replace it
- c. Connect and test

TA-312

1 REPLACE RECEIVER AMPLIFIER

- a. Remove defective amplifier
- b. Install replacement

2 REPLACE BUZZER

- a. Remove defective buzzer
- b. Install replacement
- c. Adjust as needed

3 REPLACE HANDSET

- a. Remove defective handset
- b. Install replacement



TRAINING MATERIALS FOR MPS TASKS—MOS 41C		TRAINING MATERIALS				
TASKS BY EQUIPMENT		FM	TM	VTR	SPAS	
Aiming Circle		941C/CM	941C1/2			
1	Inspect/classify aiming circle	•	•	670-091-0042	670-091-9001-H	
2	Repair aiming circle	•	•	670-091-0220		
3	Adjust aiming circle	•	•			
M17 Series Binoculars						
1	Inspect/classify binoculars	•	•			
2	Repair binoculars	•	•			
3	Adjust binoculars	•	•			
M18 Binoculars						
1	Inspect/classify binoculars	•	•	•		
2	Repair binoculars	•	•	•		
3	Adjust binoculars	•	•	•		

TRAINING MATERIALS FOR  
MPS TASKS—MOS 41C

TASKS BY EQUIPMENT

TRAINING MATERIALS

		FM	TM	VTR	SPAS
<b>M1 Collimator</b>					
1	Inspect/classify collimator	941C/CM	9-1220-203-34	670-091-0042	670-091-9001-H
2	Repair collimator	941C1/2	9-1240-324-34	670-091-0220	
3	Adjust collimator		9-1290-262-35		
<b>M13 Computer</b>					
1	Inspect/classify computer		9-1580		
2	Repair computer		9-6650-215-34		
			750-116		

TRAINING MATERIALS FOR  
MPS TASKS—MOS 41C

TASKS BY EQUIPMENT

TRAINING MATERIALS

	FM	TECHNICAL MANUALS												TB	TEC	SPAS
		9-1240-273-34	9-1240-275-34	9-1240-313-34	9-1240-314-34	9-1240-379-34	9-1290-200-14	9-1290-232-35	9-1290-322-35	9-6650-216-34	9-6650-217-34	11-6625-366-15	750-16			
M1 Quadrant	9-41C/CM	•	•	•	•	•	•	•	•	•	•	•	•	9-6625-961-35	101-113-4775	670-091-9004-T
1 Inspect/classify quadrant	9-41C/CM	•	•	•	•	•	•	•	•	•	•	•	•	•	101-113-4776	670-091-9005-T
2 Repair quadrant	•	•	•	•	•	•	•	•	•	•	•	•	•	•	101-113-4777	670-091-9006-T
3 Adjust quadrant	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	670-091-9010-T
M19 Periscope	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
1 Inspect/classify periscope	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
2 Repair periscope	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
M32/36 Periscope	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
1 Inspect/classify periscope	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
2 Repair periscope	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
3 Repair powerpack	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•

TRAINING MATERIALS FOR  
MPS TASKS—MOS 41C

TASKS BY EQUIPMENT

TRAINING MATERIALS

	FM	TECHNICAL MANUALS	TB	TEC	SPAS
M13/15 Quadrant					
1 Inspect/classify quadrant	•	9-1240-273-34		101-113-4775	670-091-9004-H
2 Repair quadrant	•	9-1240-313-34		101-113-4776	670-091-9005-H
M145 Telescope Mount					
1 Inspect/classify mount	•	9-1240-275-34		101-113-4777	670-091-9006-H
2 Repair mount	•	9-1240-314-34			
3 Adjust mount	•	9-1240-379-34			
	•	9-1290-200-14			
	•	9-1290-232-35			
	•	9-1290-322-35			
	•	9-6650-216-34			
	•	9-6650-217-34			
	•	11-6625-366-15			
	•	750-16	9-6625-961-35		

**TRAINING MATERIALS FOR  
MPS TASKS—MOS 41C**

**TASKS BY EQUIPMENT**

**TRAINING MATERIALS**

	FM	TM	SPAS
<b>M17 Rangefinder</b>			
1 Inspect/classify rangefinder	•	•	•
2 Repair rangefinder	•	•	•
3 Adjust rangefinder	•	•	•
<b>M53 Sight</b>			
1 Inspect/classify sight	•	•	•
2 Repair sight	•	•	•
<b>M105 Telescope</b>			
1 Inspect/classify telescope	•	•	•
2 Purge and charge telescope	•	•	•
3 Repair telescope	•	•	•

## TRAINING MATERIALS

## TASKS BY EQUIPMENT

TRAINING MATERIALS FOR NPS TASKS—MOS 41C					
TASKS BY EQUIPMENT					
M118 Telescope					
1 Inspect/classify telescope	9.41C/CM	9.41C1/2			
2 Repair telescope					
M117 Telescope					
1 Inspect/classify telescope					
2 Repair telescope					

## TRAINING MATERIALS

## TASKS BY EQUIPMENT

## M10 Ballistic Drive

	Start	End	Notes	Signature
1 Inspect/classify drive				
Infinity Sight				
1 Inspect/classify sight				
2 Repair sight				
Compass				
1 Inspect/classify compass				

## MPS TASKS AND KEY STEPS BY EQUIPMENT FOR MOS 41C

### AIMING CIRCLE

MPS Tasks	Key Steps
1. INSPECT/CLASSIFY AIMING CIRCLE (SM 091-467-2002)	a. Inspect for completeness b. Inspect for appearance c. Inspect mechanical components d. Inspect sealing e. Record deficiencies found
2. REPAIR AIMING CIRCLE (SM 091-467-1001)	a. Remove elevation worm, azimuth worm, orienting worm and associated parts b. Repair or replace parts as necessary c. Clean optics d. Install in reverse order
3. ADJUST AIMING CIRCLE (SM 091-467-1002)	a. Set up azimuth test fixture b. Adjust for: Eyepiece focus Parallax of objective assembly Definition of image Reticle tilt Image tilt Collimation Lift Magnetic needle clearance Magnetic needle balance Parallax of magnifier assembly Reticle illumination Excessive backlash in worms Excessive circular error Incorrect movement of telescope Magnetic needle return

### M17 SERIES BINOCULAR

1. INSPECT/CLASSIFY BINOCULAR (SM 091-467-2004)	a. Inspect completeness and appearance b. Inspect mechanical operation c. Inspect sealings d. Check application of MWO's e. Inspect seals, indexes, data plates f. Inspect finish and castings g. Check lubrication h. Inspect optical elements
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**INSPECT/CLASSIFY BINOCULAR  
(CONTINUED)**

**2. REPAIR BINOCULAR  
(SM 091-467-1012)**

- i. Check definition of field of view
- j. Check for parallax
- k. Check for tilt in field of view
- l. Check for reticle tilt
- m. Check for double image
- n. Inspect interpupillary scale setting
- o. Check for stagger of eyepiece
- p. Record deficiencies found

**3. ADJUST BINOCULAR  
(SM 091-467-1013)**

- a. Remove eye guards
- b. Remove body covers
- c. Remove reticle assembly
- d. Remove prism shelf assembly
- e. Remove objective assemblies
- f. Remove eyepiece assemblies
- g. Disassemble assemblies
- h. Repair/replace parts as needed
- i. Clean optics
- j. Assemble and install in reverse order
- k. Test and adjust

**Adjust for:**

Definition of field of view  
Proper diopter setting  
Parallax  
Eyepiece movement  
Stagger of eyepiece  
Tilt of reticle  
Collimation

**M18 BINOCULAR**

**1. INSPECT/CLASSIFY  
BINOCULAR  
(SM 091-467-2005)**

- a. Inspect:
  - Completeness and appearance
  - Optics
  - Image steadiness
  - Focus range
  - Interpupillary distance
  - Collimation
  - Diopter adjustment
  - Sealing

**b. Record deficiencies found**

**2. REPAIR BINOCULAR  
(SM 091-467-1018)**

- a. Repair/replace cables and straps
- b. Repair painted surfaces
- c. Replace power battery, if necessary
- d. Replace power supply, if necessary

## REPAIR BINOCULAR (CONTINUED)

### 3. ADJUST BINOCULAR (SM 091-467-1019)

- e. Replace on-off switch, if necessary
- f. Test and adjust
- a. Place in fixture and turn on
- b. Position double collimator
- c. Adjust left body and left collimator
- d. Adjust right body and right collimator
- e. Remove double collimator
- f. Remove eye shield
- g. Set diopter scale to "0"
- h. Position diopter and adjust eyepieces
- i. Turn off and remove from fixture

## M1 COLLIMATOR

### 1. INSPECT/CLASSIFY COLLIMATOR (SM 091-467-2007)

- a. Inspect:
  - Appearance
  - Reticle pattern
  - Mounting surface
  - Level vial
  - Knob torque
  - Lamp housing
  - Tripod
  - Optics
- b. If applicable, inspect:
  - Remote control light source
  - Electrical cables
  - Battery power supply
  - Tripod mount
  - Cover
- c. Record deficiencies found

### 2. REPAIR COLLIMATOR (SM 091-467-1027)

- a. Disassemble collimator
- b. Repair or replace defective components
- c. Clean and lubricate components
- d. Assemble collimator

### 3. ADJUST COLLIMATOR

- a. Adjust torque to turn knobs, clamps, and barrel
- b. Charge collimator

## M13 COMPUTER

### 1. INSPECT/CLASSIFY COMPUTER (SM 091-467-2011)

- a. Inspect:
  - Range scale illumination

**INSPECT/CLASSIFY COMPUTER  
(CONTINUED)**

**2. REPAIR COMPUTER  
(SM 091-467-1060)**

- Reset indicator light
- Ammo selector handle
- Superelevation handcrank
- Superelevation mil counter
- Servomotor operation
- Input and output shafts
- b. Record deficiencies found
- a. Connect power and turn on
- b. Replace circuit breaker, if necessary
- c. Repair wiring, if necessary
- d. Replace hand crank interrupter switch, if necessary
- e. Replace motor, if necessary
- f. Replace capacitor, if necessary
- g. Re-align antibacklash gear
- h. Turn off and disconnect power

**M1 QUADRANT**

**1. INSPECT/CLASSIFY QUADRANT  
(SM 091-467-2008)**

- a. Inspect:
  - Appearance
  - Mechanical components
  - Level vial
  - Frame
  - Carrying case
- b. Record deficiencies found

**2. REPAIR QUADRANT  
(SM 091-467-1034)**

- a. Replace as necessary:
  - Level vial
  - Level holder
  - Radial arm
  - Micrometer knob
  - Shoes
- b. Clean shoes and check for accuracy
- c. Grind to 90° if necessary

**3. ADJUST QUADRANT  
(SM 091-467-1035)**

- a. Set pointer to "0" on left scale
- b. Turn micrometer knob counterclockwise to bring radial arm and level vial holder index marks into coincidence
- c. Adjust level vial to center bubble
- d. Rotate quadrant 180°
- e. Readjust level vial
- f. Install slotted plug in holder
- g. Drive pin through holder and plug

### **M19 PERISCOPE**

**1. INSPECT/CLASSIFY PERISCOPE  
(SM 091-467-2012)**

- a. Inspect:
  - Appearance
  - Optical components
  - Electrical components
  - Operation
- b. Record deficiencies found

**2. REPAIR PERISCOPE  
(SM 091-467-1070)**

- a. Remove headrest and elevation lock
- b. Remove cover
- c. Replace defective wires and cables
- d. Replace defective terminal boards
- e. Install in reverse order

### **M32/36 PERISCOPE**

**1. INSPECT/CLASSIFY PERISCOPE  
(SM 091-467-2013  
SM 091-467-2014)**

- a. Inspect:
  - Completeness and appearance
  - Seals
  - Decals
  - Diopter scales
  - Finish
  - Eyepiece bodies
  - Boresight knobs
  - Optical elements
  - Electrical components
- b. Record deficiencies found

**2. REPAIR PERISCOPE  
(SM 091-467-1077)**

- a. Turn on shutter and tube
- b. Check image
- c. Replace regulator and image tube as necessary
- d. Check continuity of cable
- e. Replace potentiometer, resistor and/or diode as necessary
- f. Replace elbow as necessary
- g. Purge and charge elbow
- h. Turn tube and shutter off

**3. REPAIR POWER PACK**

- a. Remove cover
- b. Replace defective components
- c. Repair electrical contacts
- d. Install cover

### **M13/M15 QUADRANT**

**1. INSPECT/CLASSIFY QUADRANT  
(SM 091-467-2017)**

- a. Inspect completeness and appearance

**INSPECT/CLASSIFY QUADRANT  
(CONTINUED)**

**2. REPAIR QUADRANT  
(SM 091-467-1099)**

- b. Inspect function of:
  - Toggle switch
  - Elevation
  - Cross level
  - Correction knobs
- c. Inspect excursion travel and accuracy of:
  - Cross and elevation levels
  - Elevation and correction counters
- d. Inspect backlash in elevation and cross level worms
- e. Record deficiencies found
- a. Remove cover and knobs
- b. Remove lever and counter assemblies
- c. Remove detent parts
- d. Remove sector gear
- e. Disconnect electrical lead
- f. Remove shaft
- g. Replace defective components
- h. Install in reverse order
- i. Test and adjust

**M145 TELESCOPE MOUNT**

**1. INSPECT/CLASSIFY MOUNT  
(SM 091-467-2024)**

- a. Set up mount
- b. Inspect:
  - Appearance
  - Movement
  - Operability
  - Correction counter
  - Backlash
  - Accuracy
  - Electrical components
- c. Record deficiencies found

**2. REPAIR MOUNT  
(SM 091-467-1152)**

- a. Disassemble cross level knob
- b. Check cross level movement
- c. Replace defective components
- d. Assemble cross level knob
- e. Disassemble pitch level vial
- f. Replace defective components
- g. Assemble pitch level vial

**3. ADJUST MOUNT  
(SM 091-467-1153)**

- a. Adjust support level vials
- b. Adjust elevation level vial

## ADJUST MOUNT (CONTINUED)

- c. Adjust pitch level vial
- d. Adjust cross level vial

## M17 RANGEFINDER

- 1. INSPECT/CLASSIFY RANGEFINDER  
(SM 091-467-2025)

- a. Inspect:
  - End housings
  - Optical components
  - Electrical components
  - Eyepiece adjustment
  - Knob travel
- b. Record deficiencies found

- 2. REPAIR RANGEFINDER  
(SM 091-467-1162)

- a. Remove lamps
- b. Replace defective components
- c. Install lamps
- d. Remove panel
- e. Replace panel or components
- f. Install panel

- 3. ADJUST RANGEFINDER  
(SM 091-467-1163)

- a. Adjust eyepiece assembly
- b. Adjust travel knobs

## M53 SIGHT

- 1. INSPECT/CLASSIFY SIGHT  
(SM 091-467-2026)

- a. Set up target and mount
- b. Install sight
- c. Inspect:
  - Completeness and appearance
  - Performance
  - Accuracy
  - Illumination
- d. Record deficiencies found

- 2. REPAIR SIGHT  
(SM 091-467-1175)

- a. Remove level vial
- b. Install replacement vial

## M105 TELESCOPE

- 1. INSPECT/CLASSIFY TELESCOPE  
(SM 091-467-2027)

- a. Inspect:
  - Completeness and appearance
  - Mechanical components
  - Seals
  - Legibility of scale numbers
  - Instrument and mounting surfaces
  - Headrest
  - Light adapter connection
  - Bearing surfaces

**INSPECT/CLASSIFY TELESCOPE  
(CONTINUED)**

Definition of view and reticle  
Image tilt or aberration  
Parallax  
Optical components  
Reticle selector control

b. Record deficiencies found

**2. PURGE AND CHARGE TELESCOPE**

- a. Purge telescope
- b. Charge telescope

**3. REPAIR TELESCOPE  
(SM 091-467-1185)**

- a. Remove window and packing
- b. Install packing and window
- c. Disassemble headrest
- d. Replace defective components
- e. Assemble headrest

**M118 TELESCOPE**

**1. INSPECT/CLASSIFY TELESCOPE  
(SM 091-467-2029)**

- a. Set up telescope on supports
- b. Check running torque of knobs and lever
- c. Inspect:
  - Completeness and appearance
  - Cant movement
  - Optics
  - Eyepiece arm movement
  - Eyepiece focus
  - Parallax
  - Definition of field of view
  - Line of sight
  - Illumination
  - Seals

- d. Remove telescope from supports
- e. Record deficiencies found

**2. REPAIR TELESCOPE  
(SM 091-467-1205)**

- a. Remove level vial components
- b. Install replacement components
- c. Adjust level vial
- d. Remove variable resistor
- e. Disassemble resistor and replace defective components
- f. Assemble and install resistor

**M117 TELESCOPE**

**1. INSPECT/CLASSIFY TELESCOPE  
(SM 091-467-2034)**

- a. Inspect:
  - Completeness and appearance
  - Operability of knobs
  - Optics
  - Elbow assembly

**INSPECT CLASSIFY TELESCOPE  
(CONTINUED)**

Eyepiece focus  
Parallax  
Definition of field of view  
Counters for backlash and  
operation  
Illumination  
Seals

**2. REPAIR TELESCOPE  
(SM 091-467-1243)**

- b. Record deficiencies found
- a. Replace hand crank, if necessary
- b. Replace purging valve, if necessary
- c. Replace bearings in head assembly, if necessary
- d. Replace light bulbs, if necessary
- e. Clean contacts

**M10 BALLISTIC DRIVE**

**1. INSPECT/CLASSIFY DRIVE  
(SM 091-467-2035)**

- a. Inspect superelevation input shaft travel
- b. Inspect superelevation input shaft for proper torque
- c. Record deficiencies found

**2. REPAIR DRIVE**

- a. Remove drive
- b. Disassemble drive
- c. Repair/replace unserviceable components
- d. Assemble and install drive
- e. Adjust and test

**INFINITY SIGHT**

**1. INSPECT/CLASSIFY SIGHT**

- a. Inspect reticle
- b. Inspect boresight knob travel
- c. Test boresight knob torque
- d. Record deficiencies found

**2. REPAIR INFINITY SIGHT**

- a. Purge and charge sight
- b. Replace bulb as necessary
- c. Repair/replace switch, as necessary

**COMPASS**

**1. INSPECT/CLASSIFY COMPASS**

- a. Inspect compass
- b. Record deficiencies found



# TRAINING MATERIALS

## TRAINING MATERIALS FOR MPS TASKS—MOS 44B

### TASKS BY JOB

#### Oxyacetylene Welding

	FM	TM	COR CRS
	9-44B/CM 9-44B1/2 43-2	9-237	ODO425 ODO426
1 Flat position welding		•	•
2 Horizontal position welding		•	•
3 Vertical position welding		•	•
4 Overhead position welding		•	•
5 Weld pipe	•	•	•
6 Weld aluminum	•	•	•
7 Cut steel	•	•	•

# TRAINING MATERIALS

## TRAINING MATERIALS FOR MPS TASKS—MOS 448

### TASKS BY JOB

#### Arc Welding

	FM	TM	COR. CRS.
1 Flat position welding	9.44B/CM 9.44B1/2 43-2	9-237	OD0425 OD0426
2 Horizontal position welding	•	•	•
3 Vertical position welding	•	•	•
4 Overhead position welding	•	•	•
5 Weld pipe	•	•	•
6 Weld armor plate	•	•	•
7 Cut metal	•	•	•
8 With MIG gun	•	•	•
9 With TIG torch	•	•	•

# TRAINING MATERIALS

## TRAINING MATERIALS FOR MPS TASKS—MOS 44B

### TASKS BY JOB

		FM	TM	TB	COR. CRS.
<b>Glass Repair</b>		9.44B/CM 9.44B1/2 43-2	9.237 750-254	9-2320-247-40	ODO425 ODO426
1	Cut laminated safety glass	•	•		•
2	Grind glass	•			•
3	Replace glass frames and weather stripping	•			•
<b>Fuel Tank Repair</b>					
1	Repair fuel tank	•	•		•
2	Repair aluminum fuel cell	•	•		•
<b>Radiator Repair</b>					
1	Test radiators		•		
2	Repair radiators	•	•		•

TRAINING MATERIALS FOR  
MPS TASKS—MOS 44B

TASKS BY JOB

Body Repair

1	Perform roughing and aligning
2	Perform hammer finishing
3	Perform hydraulic body jack operations
4	Perform fabrication
5	Replace cross member rivets

TRAINING MATERIALS

FM	TM	TB	COR. CRS.
9-44B/CM	9-237	9-2320-247-40	ODO425
9-44B1/2	750-254		
43-2			
•	•		•
•	•		•
•	•		•
•	•		•
•	•	•	•
•	•		•

## MPS TASKS AND KEY STEPS BY JOB FOR MOS 44B

### Oxyacetylene Welding

MPS Task	Key Steps
1. FLAT POSITION WELDING	<ul style="list-style-type: none"><li>a. Lay-out material</li><li>b. Set up oxyacetylene welding set</li><li>c. Select and install correct size welding tip</li><li>d. Adjust oxygen and acetylene working pressures</li><li>e. Clean metal to be welded</li><li>f. Select type of joint</li><li>g. Align, clamp and tack weld joint</li><li>h. Weld the joint in flat position</li></ul>
2. HORIZONTAL POSITION WELDING	<ul style="list-style-type: none"><li>a. Lay-out material</li><li>b. Set up oxyacetylene welding set</li><li>c. Select and install correct size welding tip</li><li>d. Adjust oxygen and acetylene working pressures</li><li>e. Clean metal to be welded</li><li>f. Select type of joint</li><li>g. Align, clamp and tack weld joint</li><li>h. Weld joint in horizontal position</li></ul>
3. VERTICAL POSITION WELDING	<ul style="list-style-type: none"><li>a. Lay-out material</li><li>b. Set up oxyacetylene welding set</li><li>c. Select and install correct size working tip</li><li>d. Adjust oxygen and acetylene working pressures</li><li>e. Clean metal to be welded</li><li>f. Select type of joint</li><li>g. Align, clamp and tack weld joint</li><li>h. Weld joint in vertical position</li></ul>
4. OVERHEAD POSITION WELDING (SM 091-468-1002)	<ul style="list-style-type: none"><li>a. Lay-out material</li><li>b. Set up oxyacetylene welding set</li><li>c. Select and install correct size working tip</li><li>d. Adjust oxygen and acetylene working pressures</li></ul>

**OVERHEAD POSITION WELDING  
(CONTINUED)**

**5. WELD PIPE  
(SM 091-468-1003)**

- e. Clean metal to be welded
- f. Select type of joint
- g. Align, clamp and tack weld joint
- h. Weld joint in overhead position

- a. Lay-out material
- b. Set up oxyacetylene welding set with cutting attachment
- c. Cut pipe
- d. Select rod material
- e. Bevel and prepare pipe
- f. Align pipe
- g. Weld pipe

**6. WELD ALUMINUM  
(SM 091-468-1005)**

- a. Lay-out material
- b. Set up oxyacetylene welding set
- c. Select and install correct size welding tip
- d. Adjust oxygen and acetylene working pressures
- e. Clean metal to be welded
- f. Select type of joint
- g. Align, clamp and tack weld joint
- h. Weld joint

**7. CUT STEEL  
(SM 091-468-1006)**

- a. Mark metal to be cut
- b. Set up oxyacetylene welding set with cutting attachment
- c. Install correct size cutting tip
- d. Cut metal as marked
- e. Remove slag and smooth edges

**ARC WELDING**

**1. FLAT POSITION WELDING  
(SM 091-468-1061 w/TIG)**

- a. Lay-out material
- b. Set up arc welder
- c. Select proper electrode
- d. Prepare metal to be welded
- e. Position item to be repaired and secure
- f. Weld the piece
- g. Clean welds after each pass, if applicable

**2. HORIZONTAL POSITION WELDING  
(SM 091-468-1040 w/MIG)**

- a. Lay-out material
- b. Set up arc welder

HORIZONTAL POSITION WELDING  
(CONTINUED)

3. VERTICAL POSITION WELDING  
(SM 091-468-1041 w/MIG)

- c. Select proper electrode
- d. Prepare metal to be welded
- e. Position item to be repaired and secure
- f. Weld in the horizontal position
- g. Clean the welds after each pass, if applicable

4. OVERHEAD POSITION WELDING  
(SM 091-468-1021  
SM 091-468-1042 w/MIG)

- a. Lay-out material
- b. Set up arc welder
- c. Select proper electrode
- d. Prepare metal to be welded
- e. Position item to be repaired and secure
- f. Weld in the vertical position
- g. Clean the welds after each pass, if applicable

5. WELD PIPE  
(SM 091-468-1022)

- a. Lay-out material
- b. Set up arc welder
- c. Select proper electrode
- d. Prepare metal to be welded
- e. Position item to be repaired and secure
- f. Weld in the overhead position
- g. Clean welds after each pass, if applicable

6. WELD ARMOR PLATE  
(SM 091-468-1023)

- a. Lay-out material
- b. Set up arc welder
- c. Select proper electrode
- d. Set up oxyacetylene welding set with cutting attachment
- e. Cut pipe to size
- f. Align pipe
- g. Weld the pipe

7. CUT METAL  
(SM 091-468-1024)

- a. Set up arc welding machine
- b. Set up oxyacetylene welding set with cutting attachment
- c. Identify armor plate
- d. Prepare damaged area for repair
- e. Cut and fit patch if applicable
- f. Weld the armor plate

- a. Set up arc welder
- b. Lay-out and mark metal to be cut
- c. Set welding machine to maximum amperage.

## **CUT METAL (CONTINUED)**

### **8. WITH MIG GUN**

- d. Establish arc and start air stream
- e. Cut metal as marked

- a. Lay-out material if required
- b. Set up arc welder
- c. Set up MIG gun
- d. Clean metal to be welded
- e. Select type of joint
- f. Align and clamp joint
- g. Weld joint

### **9. WITH TIG TORCH**

- a. Lay-out material if required
- b. Set up arc welder
- c. Set up TIG torch
- d. Clean metal to be welded
- e. Select type of joint
- f. Align and clamp joint
- g. Weld joint

## **GLASS REPAIR**

### **1. CUT LAMINATED SAFETY GLASS (SM 091-468-1080)**

- a. Lay-out pattern of glass to be cut
- b. Cut and crack both sides of glass
- c. Cut plastic between the sheets of glass

### **2. GRIND GLASS (SM 091-468-1081)**

- a. Rough grind glass on grinding wheel
- b. Finish grind glass on belt edger

### **3. REPLACE GLASS FRAMES AND WEATHER STRIPPING (SM 091-468-1082)**

- a. Remove and repair damaged frame
- b. Remove deteriorated or damaged weather stripping
- c. Replace weather stripping
- d. Install glass in frame
- e. Install frame on vehicle

## **FUEL TANK REPAIR**

### **1. REPAIR FUEL TANK (SM 091-468-1100)**

- a. Set up oxyacetylene welding set
- b. Clean area to be repaired
- c. Tin damaged area



## REPAIR FUEL TANK (CONTINUED)

### 2. REPAIR ALUMINUM FUEL CELL (SM 091-468-1101)

- d. Cut and tin patch
- e. Sweat the patch on with soldering iron
- f. Test patch with compressed air
- a. Set up oxyacetylene welding set and MIG gun
- b. Prepare fuel cell
- c. Weld fuel cell
- d. Test fuel cell

## RADIATOR REPAIR

### 1. TEST RADIATORS

- a. Remove radiator cap
- b. Attach radiator test plug set and regulator
- c. Attach air supply to regulator
- d. Attain and hold pressure
- e. Note and record deficiencies

### 2. REPAIR RADIATORS (SM 091-468-1120)

- a. Set up oxyacetylene welding set
- b. Clean damaged area
- c. Tin damaged area
- d. Cut and tin patch
- e. Sweat patch on damaged area
- f. Separate upper and lower tanks
- g. Replace defective tubes
- h. Assemble and test

## BODY REPAIR

### 1. PERFORM ROUGHING AND ALIGNING (SM 091-468-1140)

- a. Clean damaged area
- b. Select correct dollies and hammers
- c. Release locked ridges and creases
- d. Rough out high and low creases
- e. Weld torn metal if necessary
- f. Align connecting surfaces

### 2. PERFORM HAMMER FINISHING (SM 091-468-1141)

- a. Clean underside of damaged area
- b. Select proper dolly and hammer
- c. Use the direct hammering method

### 3. PERFORM HYDRAULIC BODY JACK OPERATIONS

### 4. FABRICATE PANEL (SM 091-468-1147)

- a. Remove damaged panel
- b. Lay-out replacement panel

FABRICATE PANEL (CONTINUED)

5. REPLACE CROSS MEMBER RIVETS  
(SM 091-468-1148)

- c. Use shrinking process if necessary
  - d. Weld replacement panel
  - e. Sand or grind welds to contour
- 
- a. Jack up vehicle and place on jack stands
  - b. Clamp and secure cross member
  - c. Remove rivets
  - d. Replace with bolts

TRAINING MATERIALS FOR  
MPS TASKS—MOS 458

TASKS BY EQUIPMENT

M16 Rifle

	FM	TM	TEC	COR CRS.
1 Inspect/classify rifle	9-45B/CM	9-1005-211-35	641-091-0103	OD0413
2 Replace barrel and front sight	9-45B1/2	9-1005-249-34	641-091-0104	OD0605
3 Replace bolt		9-1010-221-24	641-091-0477	
4 Replace bolt ring				
5 Repair upper receiver assembly				
6 Repair lower receiver group				
Col .45 Pistol				
1 Inspect/classify pistol				
2 Repair slide group				
3 Repair receiver group				
M203 Grenade Launcher				
1 Inspect/classify launcher				
2 Repair receiver assembly				

TRAINING MATERIALS

## TRAINING MATERIALS

## TASKS BY EQUIPMENT

## 81mm Mortar

TRAINING MATERIALS FOR MPS TASKS—MOS 45B					
TASKS BY EQUIPMENT					
	FM	TM	TEC	COR. CHS.	
<b>81mm Mortar</b>					
1 Inspect/classify mortar	9-45B/C/M	9-1000-202-14	643-091-5706	OD0416	
2 Repair left leg group		9-1015-215-34	643-091-5707		
3 Repair right leg group		9-1015-200-34	643-091-5708		
4 Repair base plate		9-4933-200-35			
5 Repair elevating mechanism					
6 Repair traversing mechanism					
7 Repair shock absorber					
<b>107mm Mortar</b>					
1 Inspect/classify mortar					
2 Repair shock absorber					
3 Repair bridge					
4 Repair rotator					
5 Repair traversing slide					
6 Repair standard assembly elevating and recoil group					
7 Service mortar					

# TRAINING MATERIALS

## TRAINING MATERIALS FOR MPS TASKS—MOS 45B

### TASKS BY EQUIPMENT

#### M60 MG

	F.M.	T.M.	COR. CRS.
	9-45B/CM	9-1005-213-10 9-1005-213-25 9-1005-224-24	ODO411 ODO413 ODO605
1 Inspect/classify machinegun	•	•	•
2 Repair barrel with bipod	•	•	•
3 Replace gun shoulder stock		•	•
4 Repair forearm	•	•	•
5 Repair cover	•	•	•
6 Repair rear sight	•	•	•
7 Repair operating rod	•	•	•
8 Repair receiver group	•	•	•
M2 MG			
1 Inspect/classify machinegun	•	•	•
2 Repair back plate	•	•	•
3 Repair barrel buffer group	•	•	•
4 Repair retracting slide	•	•	•
5 Repair cover group	•	•	•
6 Repair rear sight	•	•	•
7 Repair receiver group			

TRAINING MATERIALS FOR MPS TASKS—MOS ASB		TRAINING MATERIALS									
TASKS BY EQUIPMENT		FM	TM					COR. CRS.			
M85 Machinegun		9-45B/CM 9-45B1/2	9-1005-213-10	9-1005-231-25	9-1005-233-24	9-1005-313-20	9-2350-215-20	OD0411	OD0413	OD0605	
1	Inspect/classify machinegun	•	•	•	•	•	•	•	•	•	
2	Repair backplate group	•	•	•	•	•	•	•	•	•	
3	Repair barrel extension	•	•	•	•	•	•	•	•	•	
4	Repair slide group	•	•	•	•	•	•	•	•	•	
5	Repair accelerator	•	•	•	•	•	•	•	•	•	
6	Repair feed and ejector assembly	•	•	•	•	•	•	•	•	•	
7	Repair bolt	•	•	•	•	•	•	•	•	•	
8	Repair cover	•	•	•	•	•	•	•	•	•	
M240 Machinegun											
1	Inspect/classify machinegun	•	•	•	•	•	•	•	•	•	
2	Repair trigger and frame assembly	•	•	•	•	•	•	•	•	•	
3	Repair receiver assembly	•	•	•	•	•	•	•	•	•	

## MPS TASKS AND KEY STEPS BY EQUIPMENT FOR MOS 45B

### M16 RIFLE

MPS Task	Key Steps
1. INSPECT/CLASSIFY RIFLE (SM 091-470-2011)	<ul style="list-style-type: none"><li>a. Inspect upper receiver group</li><li>b. Inspect bolt carrier group</li><li>c. Inspect lower receiver group</li><li>d. Record deficiencies found</li></ul>
2. REPLACE BARREL AND FRONT SIGHT (SM 091-470-1011)	<ul style="list-style-type: none"><li>a. Remove hand guards</li><li>b. Separate upper and lower receiver, remove bolt carrier group and charging handle from upper receiver</li><li>c. Remove flash suppressor</li><li>d. Remove gas tube from front sight</li><li>e. Remove barrel from receiver</li><li>f. Install gas tube into replacement assembly</li><li>g. Install replacement barrel into receiver</li><li>h. Assemble in reverse order of removal</li><li>i. Check headspace</li></ul>
3. REPLACE BOLT (SM 091-470-1012)	<ul style="list-style-type: none"><li>a. Remove bolt retaining pins</li><li>b. Remove bolt assembly</li><li>c. Install replacement bolt</li><li>d. Check headspace</li><li>e. Install retaining pins</li></ul>
4. REPLACE BOLT RING (SM 091-470-1013)	<ul style="list-style-type: none"><li>a. Disassemble bolt carrier group</li><li>b. Remove bolt rings</li><li>c. Install bolt rings</li><li>d. Assemble bolt carrier group in reverse order</li></ul>
5. REPAIR UPPER RECEIVER ASSEMBLY (SM 091-470-2012)	<ul style="list-style-type: none"><li>a. Remove upper receiver group components</li><li>b. Repair or replace defective parts</li><li>c. Assemble in reverse order of removal and lubricate as required</li></ul>
6. REPAIR LOWER RECEIVER GROUP (SM 091-470-2013)	<ul style="list-style-type: none"><li>a. Remove lower receiver group components</li><li>b. Repair or replace group components</li><li>c. Assemble in reverse order of removal</li></ul>

## **CAL .45 PISTOL**

### **1. INSPECT/CLASSIFY PISTOL**

- a. Inspect slide group
- b. Inspect lower receiver
- c. Inspect barrel
- d. Record deficiencies found

### **2. REPAIR SLIDE GROUP (SM 091-470-1034)**

- a. Remove slide group from weapon
- b. Remove front sight
- c. Service slide group
- d. Install front sight
- e. Install slide group

### **3. REPAIR RECEIVER GROUP (SM 091-470-2042)**

- a. Disassemble weapon into major groups
- b. Disassemble receiver group into components
- c. Repair or replace defective parts
- d. Assemble in reverse order

## **M203 GRENADE LAUNCHER**

### **1. INSPECT/CLASSIFY LAUNCHER (SM 091-470-2051)**

- a. Inspect general condition of weapon
- b. Disassemble weapon into groups
- c. Inspect receiver
- d. Inspect barrel
- e. Inspect safety
- f. Inspect trigger assembly
- g. Inspect hand guard and sight assembly
- h. Inspect barrel stop and latch
- i. Inspect and gage firing pin
- j. Assemble weapon
- k. Record deficiencies found

### **2. REPAIR RECEIVER ASSEMBLY (SM 091-470-1046)**

- a. Remove backplate
- b. Remove barrel extension follower
- c. Remove trigger pin
- d. Remove cocking level and firing pin
- e. Remove retaining safety spring, and plunger
- f. Remove trigger guard



**REPAIR RECEIVER ASSEMBLY  
(CONTINUED)**

- g. Remove barrel latch
- h. Repair or replace defective parts
- i. Install in reverse order of removal

**81MM MORTAR**

**1. INSPECT/CLASSIFY MORTAR  
(SM 091-470-2056)**

- a. Inspect counter recoil action
- b. Remove cannon assembly
- c. Remove bipod assemblies
- d. Disassemble shock absorber group
- e. Inspect and assemble shock absorber group
- f. Inspect barrel and ring
- g. Disassemble lower bipod group
- h. Inspect and assemble lower bipod group
- i. Inspect base plate
- j. Install cannon
- k. Install bipod assembly
- l. Record deficiencies found

**2. REPAIR LEFT LEG GROUP  
(SM 091-470-1050)**

- a. Remove foot and collar chain
- b. Remove sliding bracket
- c. Remove sliding tube
- d. Remove rod end clevis
- e. Remove adjusting nut
- f. Inspect and repair leg body
- g. Assemble in reverse order of removal

**3. REPAIR RIGHT LEG GROUP  
(SM 091-470-1051)**

- a. Remove mount foot
- b. Remove shaft chain collar
- c. Remove rod end clevis
- d. Inspect and repair leg body
- e. Assemble in reverse order of removal

**4. REPAIR BASE PLATE  
(SM 091-470-1052)**

- a. Remove inner ring assembly
- b. Remove socket cap collar and cap
- c. Remove carrying handle
- d. Remove shoulder bolts
- e. Remove latches and carrying handle
- f. Repair or replace defective components
- g. Assemble in reverse order of removal

5. REPAIR ELEVATING MECHANISM  
(SM 091-470-2057)

- a. Disassemble mechanism into components
- b. Repair or replace defective components
- c. Assemble mechanism

6. REPAIR TRAVERSING MECHANISM  
(SM 091-470-2058)

- a. Disassemble mechanism into components
- b. Repair or replace defective components
- c. Assemble in reverse order of removal

7. REPAIR SHOCK ABSORBER

- a. Remove shock absorber from mortar tube
- b. Remove connecting rod
- c. Remove recoil spring
- d. Remove inner tube assembly
- e. Remove retainer stop
- f. Repair or replace defective parts
- g. Assemble in reverse order of removal
- h. Adjust connecting rod
- i. Install shock absorber on mortar tube

107MM MORTAR

1. INSPECT/CLASSIFY MORTAR  
(SM 091-470-2070)

- a. Inspect countercoil action
- b. Remove cannon assembly
- c. Remove bipod assemblies
- d. Disassemble shock absorber group
- e. Inspect and assemble shock absorber group
- f. Inspect barrel and ring
- g. Disassemble lower bipod group
- h. Inspect and assemble lower bipod group
- i. Inspect base plate
- j. Install cannon
- k. Install bipod assembly
- l. Record deficiencies found

2. REPAIR SHOCK ABSORBER  
(SM 091-470-1056)

- a. Remove shock absorber from mortar tube
- b. Remove connecting rod
- c. Remove recoil spring

REPAIR SHOCK ABSORBER  
(CONTINUED)

3. REPAIR BRIDGE  
(SM 091-470-1057)

- d. Remove inner tube assembly
- e. Remove retainer stop
- f. Repair or replace defective parts
- g. Assemble in reverse order of removal
- h. Adjust connecting rod
- i. Install shock absorber on mortar tube

4. REPAIR ROTATOR  
(SM 091-470-1058)

- a. Remove bridge cup assembly
- b. Remove preformed packing
- c. Remove burrs
- d. Repair threads
- e. Repair or replace defective parts
- f. Install in reverse order of removal

5. REPAIR TRAVERSING SLIDE  
(SM 091-470-2068)

- a. Remove rest pads and retainers
- b. Remove slide locks
- c. Remove slide lock retainer
- d. Remove expanding pin
- e. Remove non-metallic washer
- f. Inspect components for defects and repair or replace as necessary
- g. Assemble in reverse order of removal

6. REPAIR STANDARD ASSEMBLY ELEVATING AND RECOIL GROUP  
(SM 091-470-2069)

- a. Remove traversing slide assembly
- b. Disassemble slide assembly into components
- c. Repair or replace defective components
- d. Assemble in reverse order of disassembly and lubricate as required

7. SERVICE MORTAR  
(SM 091-470-2071)

- a. Disassemble elevating and recoil group into components
  - b. Repair or replace defective components
  - c. Assemble in reverse order of disassembly and lubricate as required
- 
- a. Disassemble mortar into major groups
  - b. Remove and disassemble shock absorbers
  - c. Service, assemble and install shock absorbers

## SERVICE MORTAR (CONTINUED)

- d. Remove and disassemble traversing slide assembly
- e. Service and assemble traversing slide assembly
- f. Disassemble components of the elevating and recoil group
- g. Service and assemble the elevating and recoil group
- h. Install traversing slide assembly
- i. Remove and service the locking group
- j. Install the locking group on rotator
- k. Service bridge assembly

## M60 MACHINEGUN

### 1. INSPECT/CLASSIFY MACHINEGUN (SM 091-470-2085)

- a. Visually inspect general appearance
- b. Remove and inspect barrel
- c. Remove and inspect trigger mechanism grip group
- d. Remove and inspect gun shoulder stock
- e. Remove and inspect forearm assembly
- f. Inspect cover assembly
- g. Inspect cartridge tray and hanger assembly
- h. Remove and inspect buffer, driving spring and guide
- i. Remove and inspect operating rod and bolt assemblies
- j. Inspect rear sight assembly
- k. Inspect barrel lock and carrying handle
- l. Inspect cocking handle assembly
- m. Inspect receiver assembly
- n. Assemble machine gun
- o. Function test machine gun
- p. Record deficiencies found

### 2. REPAIR BARREL WITH BIPOD (SM 091-470-1078)

- a. Remove flash suppressor
- b. Remove bipod legs
- c. Remove gas cylinder plug
- d. Remove gas piston
- e. Replace defective parts
- f. Install in reverse order of removal

### 3. REPLACE GUN SHOULDER STOCK

- a. Remove shoulder stock
- b. Replace rivets
- c. Install shoulder stock

4. REPAIR FOREARM  
(SM 091-470-1080)

- a. Remove forearm assembly
- b. Disassemble forearm assembly
- c. Repair or replace defective parts
- d. Assemble forearm assembly
- e. Install forearm assembly

5. REPAIR COVER  
(SM 091-470-1081)

- a. Remove cover assembly from receiver
- b. Disassemble cover assembly
- c. Repair or replace defective components
- d. Assemble components on cover
- e. Install cover on receiver

6. REPAIR REAR SIGHT  
(SM 091-470-1084)

- a. Remove windage bolt, springs and ball bearings
- b. Remove elevation scale
- c. Replace defective components
- d. Assemble in reverse order of removal

7. REPAIR OPERATING ROD  
(SM 091-470-2087)

- a. Disassemble operating rod into components
- b. Repair or replace defective components
- c. Assemble in reverse order of removal

**M2 MACHINEGUN**

1. INSPECT/CLASSIFY MACHINEGUN  
(SM 091-470-2095)

- a. Remove and inspect components of machine gun
- b. Inspect receiver group
- c. Install components in reverse order of removal
- d. Record deficiencies found

2. INSPECT/CLASSIFY BARREL

- a. Inspect barrel
- b. Record deficiencies found

3. REPAIR BACK PLATE  
(SM 091-470-1097)

- a. Remove barrel assembly
- b. Remove back plate assembly
- c. Disassemble back plate assembly
- d. Repair or replace defective components
- e. Assemble and install back plate assembly
- f. Install barrel assembly

4. REPAIR BARREL BUFFER GROUP  
(SM 091-470-1098)
  - a. Disassemble weapon into major groups
  - b. Disassemble buffer assembly
  - c. Repair or replace defective components of buffer assembly
  - d. Assemble buffer assembly, and gage length
  - e. Assemble weapon in reverse order of removal
5. REPAIR RETRACTING SLIDE  
(SM 091-470-1101)
  - a. Remove barrel, back plate, driving spring rod, bolt and buffer
  - b. Disassemble retracting slide assembly
  - c. Repair or replace defective components
  - d. Reassemble retracting slide assembly
  - e. Install components in reverse order of removal
6. REPAIR COVER GROUP  
(SM 091-470-2096)
  - a. Remove cover group from receiver
  - b. Disassemble cover group
  - c. Repair or replace defective components
  - d. Repair cover defects
  - e. Assemble cover components
  - f. Install cover on weapon
7. REPAIR REAR SIGHT  
(SM 091-470-2097)
  - a. Remove barrel back plate and driving spring rod
  - b. Remove rear sight assembly
  - c. Repair or replace defective components
  - d. Assemble receiver in reverse order
  - e. Install components
8. REPAIR RECEIVER GROUP  
(SM 091-470-2098)
  - a. Remove barrel back plate, driving spring rod, bolt stud, bolt group, barrel buffer and extension and cover group
  - b. Disassemble receiver group
  - c. Repair or replace defective components
  - d. Assemble receiver in reverse order
  - e. Install components

## M85 MACHINEGUN

1. INSPECT/CLASSIFY MACHINEGUN  
(SM 091-470-2105)
  - a. Remove and inspect components of machine gun
  - b. Inspect receiver
  - c. Install components in reverse order
  - d. Record deficiencies found
2. REPAIR BACKPLATE GROUP  
(SM 091-470-1110)
  - a. Remove barrel assembly
  - b. Remove and disassemble back plate group
  - c. Repair or replace defective components
  - d. Assemble and install back plate group
  - e. Install barrel assembly
3. REPAIR BARREL EXTENSION  
(SM 091-470-1111)
  - a. Remove weapon components
  - b. Disengage bolt assembly
  - c. Disassemble barrel extension
  - d. Repair or replace defective components
  - e. Assemble barrel extension
  - f. Engage bolt
  - g. Install components in reverse order of removal
4. REPAIR SLIDE GROUP  
(SM 091-470-1112)
  - a. Remove barrel assembly
  - b. Remove and separate cover and feed tray assemblies
  - c. Remove slide group from cover
  - d. Remove and disassemble feed slide assembly
  - e. Replace defective components
  - f. Reassemble and install in reverse order of removal
5. REPAIR ACCELERATOR  
(SM 091-470-1115)
  - a. Remove components
  - b. Disassemble accelerator assembly
  - c. Replace defective components
  - d. Assemble and install accelerator
  - e. Install components
6. REPAIR FEED AND EJECTOR ASSEMBLY  
(SM 091-470-2106)
  - a. Remove and disassemble components
  - b. Repair or replace defective components
  - c. Assemble and install in reverse order or removal

7. REPAIR BOLT  
(SM 091-470-2107)

- a. Disassemble weapon into components
- b. Remove and disassemble bolt
- c. Repair or replace defective components
- d. Assemble bolt in reverse order of disassembly
- e. Assemble components in reverse order of disassembly

8. REPAIR COVER

- a. Remove cover
- b. Disassemble cover
- c. Replace defective components
- d. Assemble and install cover

**M240 MACHINEGUN**

1. INSPECT/CLASSIFY MACHINEGUN  
(SM 091-470-2110)

- a. Remove and inspect barrel assembly
- b. Remove, disassemble and inspect buffer assembly
- c. Remove and inspect driving spring assembly
- d. Remove, disassemble, and inspect operating rod and bolt assembly
- e. Remove, disassemble and inspect the trigger and frame assembly
- f. Remove, disassemble and inspect the charger cable guide
- g. Disassemble and inspect the receiver assembly
- h. Assemble and install components on receiver
- i. Measure head space, check trigger pull and measure firing pin protrusion
- j. Record deficiencies found

2. REPAIR TRIGGER AND FRAME ASSEMBLY  
(SM 091-470-2111)

- a. Disassemble components of trigger and frame assembly
- b. Repair or replace defective components
- c. Assemble components in reverse order of disassembly

3. REPAIR RECEIVER ASSEMBLY  
(SM 091-470-2112)

- a. Disassemble components from receiver
- b. Repair or replace defective components
- c. Repair defects in receiver
- d. Assemble components on receiver in reverse order



# TRAINING MATERIALS

## TRAINING MATERIALS FOR MPS TASKS—MOS 45K/45L

### TASKS BY EQUIPMENT

#### M60 Family

	FM	TM	TEC	VTR	COR. CRS.
	9.45K/CM 9.45K1/2	9-1000-202-14 9-1000-213-35 9-2300-378-35/2 9-2350-215-20 9-2350-222-20 9-2350-222-35/2 9-2350-257-20/2 9-2350-257-34/2 9-4933-200-35	643-091-5706 643-091-5707 643-091-5708	4E-091-0176 643-091-0004 643-091-0148 643-091-0156 643-091-0164 643-091-0180 643-091-0451	ODO102 ODO606 ODO724 HK4501 HK4502 HK4503 HK4504 HK4506
1 Repair wiring harness					
2 Repair stabilization system					
3 Repair cupola ring gear and bearing assembly					
4 Replace electric power supply motor					
5 Repair turret power relay box					
6 Repair gunner's/commander's control assembly					
7 Repair accumulator					
8 Repair super-elevation actuator					
9 Replace hydraulic system (reservoir) oil pump					
10 Repair traversing gear box					
11 Repair hand elevating pump assembly					
12 Repair no-back					
13 Evaluate 105/165mm gun tube (borescope and pullover gage)					
14 Replace 105mm gun tube					
15 Repair replenisher assembly					
16 Repair recoil mechanism					
17 Repair ammunition racks					

**TRAINING MATERIALS FOR  
MPS TASKS—MOS ASK/ASL**

**TASKS BY EQUIPMENT**

**M109 Family**

	FM	TM	TEC	COR. CRS.
1 Evaluate gun tube (borescope and pullover gage)	9-45L/CM	9-1000-202-14 9-2350-217-20 9-2350-217-34/2 9-4933-200-35	643-091-5801 643-091-5706 643-091-5707 643-091-5708	ODO103 ODO606 ODO724 HL4501 HL4502 HL4507
2 Repair breechblock group	•	•	•	•
3 Repair recoil system	•	•	•	•
4 Repair equilibration system	•	•	•	•
5 Replace gunner's control	•	•	•	•
6 Repair hydraulic power pack	•	•	•	•
7 Repair elevating cylinder	•	•	•	•
8 Repair traversing mechanism	•	•	•	•
9 Replace magnetic clutch (no back)	•	•	•	•
10 Repair rammer	•	•	•	•
11 Repair replenisher assembly	•	•	•	•
12 Repair wiring	•	•	•	•

**TRAINING MATERIALS**

## MPS TASKS AND KEY STEPS BY EQUIPMENT FOR MOS 45K/45L

### M60 FAMILY

MPS Task	Key Steps
1. REPAIR WIRING HARNESS	<ul style="list-style-type: none"><li>a. Test circuits</li><li>b. Locate faulty wiring</li><li>c. Disconnect and repair wiring</li><li>d. Connect and retest</li></ul>
2. REPAIR STABILIZATION SYSTEM	<ul style="list-style-type: none"><li>a. Troubleshoot stabilization system</li><li>b. Turn off master switch</li><li>c. Fully depress main gun and tie down</li><li>d. Engage turret lock</li><li>e. Replace faulty components</li><li>f. Bleed and charge hydraulic system</li><li>g. Unlock and test system</li></ul>
3. REPAIR CUPOLA RING GEAR AND BEARING ASSEMBLY (SM 091-471-1015)	<ul style="list-style-type: none"><li>a. Remove cupola from turret</li><li>b. Remove lower race ring mounting screws and install lifting bolts</li><li>c. Remove race ring</li><li>d. Remove shims, balls and retainer</li><li>e. Remove spur gear and upper race ring</li><li>f. Clean and inspect components</li><li>g. Replace defective components</li><li>h. Install in reverse order</li></ul>
4. REPLACE ELECTRIC POWER SUPPLY MOTOR (SM 091-471-1019)	<ul style="list-style-type: none"><li>a. Position turret to access motor</li><li>b. Remove turret power distribution box and blower tube ducts</li><li>c. Disconnect electrical connector and mounting bracket</li><li>d. Lower motor on wooden block</li><li>e. Remove coupling spider</li><li>f. Remove motor from tank</li><li>g. Transfer components to replacement</li><li>h. Install in reverse order</li></ul>
5. REPAIR TURRET POWER RELAY (CONTROL) BOX	<ul style="list-style-type: none"><li>a. Remove gunner's footrest</li><li>b. Remove cover and gasket</li><li>c. Repair/replace defective components</li><li>d. Install in reverse order</li></ul>

6. REPAIR GUNNER'S/COMMANDER'S CONTROL ASSEMBLY (SM 091-471-2019)
  - a. Tag and disconnect hydraulic lines
  - b. Remove capscrews and deck clearance valve
  - c. Disconnect wiring
  - d. Remove control assembly
  - e. Disconnect manual elevation pump connectors
  - f. Remove control assembly cover
  - g. Replace defective components
  - h. Assemble and install in reverse order
  - i. Cross-torque capscrews to specification
  - j. Bleed and charge hydraulic system
7. REPAIR ACCUMULATOR (SM 091-471-1022)
  - a. Release pressure
  - b. Disconnect lines and straps
  - c. Remove accumulator
  - d. Remove accumulator components
  - e. Replace defective parts
  - f. Install in reverse order
  - g. Recharge
  - h. Adjust and test
8. REPAIR SUPERELEVATION ACTUATOR (SM 091-471-2021)
  - a. Disassemble superelevation actuator
  - b. Replace defective components
  - c. Assemble and test
9. REPLACE HYDRAULIC SYSTEM (RESERVOIR) OIL PUMP (SM 091-471-1023)
  - a. Remove electric drive motor
  - b. Remove coupling spider and coupling
  - c. Remove pump mount and gasket
  - d. Remove filter
  - e. Remove hydraulic pump
  - f. Install in reverse order
10. REPAIR TRAVERSING GEAR BOX (SM 091-471-2017)
  - a. Remove upper housing and gear train components
  - b. Disassemble differential
  - c. Replace defective components
  - d. Assemble in reverse order
11. REPAIR HAND ELEVATING PUMP ASSEMBLY (SM 091-471-2024)
  - a. Remove cable housing
  - b. Remove arm assembly
  - c. Remove locknut and unscrew retainer
  - d. Remove plate

**REPAIR HAND ELEVATING PUMP  
ASSEMBLY (CONTINUED)**

**12. REPAIR NO-BACK  
(SM 091-471-2118)**

- e. Pull out retainers, piston, guides and springs
- f. Slide block from housing
- g. Remove retainer from shaft
- h. Slide out bushing and remove packing
- i. Remove bearing and seal
- j. Repair/replace defective components
- k. Assemble in reverse order

**13. EVALUATE 105/165 MM GUN TUBE  
(SM 091-471-2035)**

- a. Remove housing cover
- b. Remove shaft coupling
- c. Remove housing
- d. Replace defective components
- e. Assemble in reverse order

**14. REPLACE 105 MM GUN TUBE  
(SM 091-471-1027)**

- a. Inspect tube with borescope
- b. Measure tube bore with pullover gage
- c. Compute average bore reading
- d. Make entries in DA Form 2408-4

**15. REPAIR REPLENISHER ASSEMBLY  
(SM 091-471-1030)**

- a. Attach sling and guide rope
- b. Remove locking pin
- c. Turn and remove gun tube
- d. Install replacement in reverse order

**16. REPAIR RECOIL MECHANISM  
(SM 091-471-2038)**

- a. Drain replenisher
- b. Remove indicator guide, pin and bracket
- c. Remove hose, fitting, valve and plug
- d. Remove and disassemble cylinder head
- e. Repair/replace defective components
- f. Assemble in reverse order
- g. Fill and test

- a. Remove bore evacuator
- b. Remove gun shield
- c. Remove adapter breech block
- d. Remove recoil mechanism
- e. Drain recoil mechanism
- f. Disassemble recoil mechanism
- g. Replace defective components

REPAIR RECOIL MECHANISM  
(CONTINUED)

17. REPAIR AMMUNITION RACKS

M109A1

1. EVALUATE GUN TUBE (BOREScope  
AND PULLOVER GAGE)  
(SM 091-472-2001)

- h. Assemble recoil mechanism
- i. Install in reverse order
- j. Fill and test mechanism

2. REPAIR BREECHBLOCK GROUP  
(SM 091-472-1003)

- a. Remove cupola
- b. Remove ammunition rack
- c. Replace damaged wells
- d. Install in reverse order

3. REPAIR RECOIL SYSTEM  
(SM 091-472-1006  
SM 091-472-2009  
SM 091-472-2011)

- a. Inspect tube with borescope
- b. Measure tube bore with pullover gage
- c. Compute average bore reading
- d. Make entries in DA Form 2408-4
- a. Release pre-load or breech closing springs and remove rack springs
- b. Elevate tube and secure breech operating cam to cab roof
- c. Remove firing mechanism and obturator spindle
- d. Remove and disassemble breech block
- e. Repair/replace defective parts
- f. Assemble and install in reverse order
- g. Adjust clearances
- a. Release pressures and drain fluid
- b. Replace counter recoil buffer, if defective
- c. Disassemble recuperator, repair/replace defective components, and assemble
- d. Disassemble recoil cylinder, repair/replace defective parts and assemble
- e. Fill, charge and test system

4. REPAIR EQUILIBRATION SYSTEM  
(SM 091-472-1011  
SM 091-472-2022  
SM 091-472-2040)

- a. Release pressures and drain fluid
- b. Remove primary accumulator
- c. Repair/replace defective components
- d. Install primary accumulator
- e. Remove secondary accumulator
- f. Repair/replace defective components

REPAIR EQUILIBRATION SYSTEM  
(CONTINUED)

5. REPLACE GUNNER'S CONTROL  
(SM 091-472-1012)

- g. Install secondary accumulator
- h. Repair/replace hydraulic manifold
- i. Repair/replace hydraulic lines
- j. Fill, charge and test system

6. REPAIR HYDRAULIC POWER PACK  
(SM 097-472-1013)

- a. Release hydraulic pressure
- b. Disconnect and remove gunner's control
- c. Install and connect replacement
- d. Fill and charge hydraulic system

7. REPAIR ELEVATING CYLINDER  
(SM 091-472-1015)

- a. Drain hydraulic system
- b. Remove cab access cover
- c. Disconnect electrical and hydraulic lines
- d. Secure lifting sling
- e. Remove power pack
- f. Disassemble into components
- g. Repair/replace defective components
- h. Assemble, adjust and shim as needed
- i. Install in reverse order
- j. Fill and charge hydraulic system

8. REPAIR TRAVERSING MECHANISM  
(SM 091-472-1017  
SM 091-472-2036)

- a. Drain hydraulic system
- b. Disconnect lines and fittings
- c. Remove upper rotor shield
- d. Remove elevating cylinder
- e. Repair/replace as needed
- f. Install in reverse order
- g. Fill and charge system

9. REPAIR/REPLACE MAGNETIC CLUTCH  
(SM 091-472-1018)

- a. Relieve hydraulic pressure
- b. Disconnect fittings and leads
- c. Remove traversing mechanism
- d. Repair/replace as needed
- e. Install, shim and lubricate traversing mechanism
- f. Connect leads and fittings
- g. Charge hydraulic system

- a. Remove brushes
- b. Disconnect and remove clutch
- c. Remove retainer ring and bearing
- d. Transfer bearing to replacement
- e. Install in reverse order

10. REPAIR RAMMER  
(SM 091-472-2042)

- a. Release hydraulic pressure
- b. Remove rammer
- c. Disassemble cylinder and repair/replace defective components
- d. Assemble and install in reverse order
- e. Charge hydraulic system

11. REPAIR REPLENISHER ASSEMBLY  
(SM 091-472-1045)

- a. Drain hydraulic fluid and disconnect tube
- b. Remove replenisher assembly
- c. Disassemble and repair/replace defective components
- d. Assemble and install in reverse order
- e. Fill and charge hydraulic system

12. REPAIR WIRING

- a. Test circuits
- b. Locate faulty wiring
- c. Disconnect and repair wiring
- d. Connect and retest



TRAINING MATERIALS FOR  
MPS TASKS—MOS 52D

TASKS BY EQUIPMENT

GED Generator

TRAINING MATERIALS

	FM	TM	TEC	VTR	COR CRS
	5-52D/CM	5-674	101-113-4775 101-113-4776 101-113-4777 610-091-6051 610-091-6052 610-091-6053 610-091-6054 610-091-6056 610-091-6057 610-091-6060 610-091-6061 610-091-6062 662-051-7607 662-051-7608	4N-091-0205 610-091-0795	ODO726 SS9448
1 Inspect/classify generator	•	•			
2 Replace engine	•	•	•	•	•
3 Replace lubrication system components		•			
4 Replace intake/exhaust system components		•			
5 Replace fuel system components		•			
6 Replace starting system components	•	•	•	•	•
7 Repair wiring		•			
8 Replace load connection group components	•	•	•		•
9 Replace fault indicator/control panel	•	•	•	•	•
10 Replace voltage regulator	•	•	•		

# TRAINING MATERIALS

## TRAINING MATERIALS FOR MPS TASKS—MOS 520

### TASKS BY EQUIPMENT

#### DED Generator

	FM	TM	TEC	VTH	COR. CRS.
1 Inspect/classify generator	•	5-52D/CM	101-113-4775	4N-091-0205	ODO726
2 Replace engine	•	5-52D/2	101-113-4776	610-091-0795	ODO727
3 Replace lubrication system components		5-52D/1	101-113-4777	610-091-0205	SS9448
4 Replace intake/exhaust system components		5-52D/2	101-113-4778	610-091-0205	SS9448
5 Replace fuel system components		5-52D/2	101-113-4779	610-091-0205	SS9448
6 Replace starting system components	•	5-52D/2	101-113-4780	610-091-0205	SS9448
7 Repair wiring	•	5-52D/2	101-113-4781	610-091-0205	SS9448
8 Replace load connection group components	•	5-52D/2	101-113-4782	610-091-0205	SS9448
9 Replace fault indicator/control panel	•	5-52D/2	101-113-4783	610-091-0205	SS9448
10 Replace voltage regulator	•	5-52D/2	101-113-4784	610-091-0205	SS9448

## MPS TASKS AND KEY STEPS BY EQUIPMENT FOR MOS 52D

### GED GENERATOR

MPS Tasks	Key Steps
1. INSPECT/CLASSIFY GENERATOR (SM 051-234-1500)	a. Inspect engine assembly b. Verify reported malfunctions c. Identify damaged or missing components d. Record faults found
2. REPLACE ENGINE (SM 051-234-1501)	a. Remove batteries b. Remove frame and control box c. Remove engine d. Install replacement in reverse order
3. REPLACE LUBRICATION SYSTEM COMPONENTS (SM 051-234-1506)	a. Remove as necessary: Oil lines Oil cooler Pressure gage Pressure transmitter Pressure shutdown switch Oil pan Oil pump b. Replace defective assemblies c. Install in reverse order
4. REPLACE INTAKE/EXHAUST SYSTEM COMPONENTS (SM 051-234-1507)	a. Remove as necessary: Intake manifold Exhaust manifold and muffler Blower Turbocharger b. Replace defective components c. Install in reverse order
5. REPLACE FUEL SYSTEM COMPONENTS (SM 051-234-1509)	a. Remove as necessary: Fuel tank Fuel lines, valve and bowl Fuel filters Fuel pump Carburetor b. Replace defective assemblies c. Install in reverse order

6. REPLACE STARTING SYSTEM COMPONENTS  
(SM 051-234-1514)
  - a. Remove as necessary:
    - Battery cables
    - Starter
    - Starter solenoid
    - Starter switch
    - Starter relays
    - Wiring harness
    - Speed switch
  - b. Replace defective components
  - c. Install in reverse order
7. REPAIR WIRING  
(SM 051-234-2610)
  - a. Test wires for continuity
  - b. Locate faulty wiring
  - c. Disconnect and repair wiring
  - d. Connect and retest
8. REPLACE LOAD CONNECTION GROUP COMPONENTS  
(SM 051-234-1524)
  - a. Remove as necessary:
    - Main load contactor
    - Current transformer
    - Output terminal board
  - b. Replace defective assemblies
  - c. Install in reverse order
9. REPLACE FAULT INDICATOR/CONTROL PANEL  
(SM 051-234-1528)
  - a. Tag all electrical leads
  - b. Remove fault indicator/control panel
  - c. Install replacement
  - d. Remove tags
10. REPLACE VOLTAGE REGULATOR  
(SM 051-234-1533)
  - a. Tag all electrical leads
  - b. Remove voltage regulator
  - c. Install replacement

#### DED GENERATOR

1. INSPECT/CLASSIFY GENERATOR  
(SM 051-234-1500)
  - a. Inspect engine assembly
  - b. Verify reported malfunctions
  - c. Identify damaged or missing components
  - d. Record faults found
2. REPLACE ENGINE  
(SM 051-234-2602)
  - a. Remove batteries
  - b. Remove frame and control box
  - c. Remove engine
  - d. Install replacement in reverse order
3. REPLACE LUBRICATION SYSTEM COMPONENTS
  - a. Remove as necessary:
    - Oil lines

REPLACE LUBRICATION SYSTEM  
COMPONENTS (CONTINUED)  
(SM 051-234-1506)

Oil cooler  
Pressure gage  
Pressure transmitter  
Pressure shutdown switch  
Oil pan  
Oil pump

- b. Replace defective assemblies
- c. Install in reverse order

4. REPLACE INTAKE/EXHAUST SYSTEM  
COMPONENTS  
(SM 051-234-1507)

- a. Remove as necessary:
  - Intake manifold
  - Exhaust manifold and muffler
  - Blower
  - Turbocharger
- b. Replace defective components
- c. Install in reverse order

5. REPLACE FUEL SYSTEM COMPONENTS  
(SM 051-234-1511)

- a. Remove as necessary:
  - Fuel tanks
  - Fuel lines, valve and bowl
  - Fuel filters
  - Transfer pump
  - Injector pump
  - Injector holders
  - Injector nozzles
- b. Replace defective assemblies
- c. Install in reverse order

6. REPLACE STARTING SYSTEM COMPO-  
NENTS  
(SM 051-234-1514)

- a. Remove as necessary:
  - Battery cables
  - Starter
  - Starter solenoid
  - Starter switch
  - Starter relays
  - Wiring harness
  - Speed switch
- b. Replace defective components
- c. Install in reverse order

7. REPAIR WIRING  
(SM 051-234-2610)

- a. Test wires for continuity
- b. Locate faulty wiring
- c. Disconnect and repair wiring
- d. Connect and retest

8. REPLACE LOAD CONNECTION GROUP  
COMPONENTS  
(SM 051-234-1524)

- a. Remove as necessary:
  - Main load contactor
  - Current transformer
  - Output terminal board

REPLACE LOAD CONNECTION GROUP  
COMPONENTS (CONTINUED)

- |  |   |
|--|---|
| 9. REPLACE FAULT INDICATOR/CONTROL<br>PANEL<br>(SM 051-234-1528) | b. Replace defective assemblies<br>c. Install in reverse order  |
| 10. REPLACE VOLTAGE REGULATOR<br>(SM 051-234-1533)               | a. Tag all electrical leads<br>b. Remove fault indicator/control<br>panel<br>c. Install replacement<br>d. Remove tags |
|  | a. Tag all electrical leads<br>b. Remove voltage regulator<br>c. Install replacement                                  |

TRAINING MATERIALS FOR  
MPS TASKS—MOS 63G

TASKS BY EQUIPMENT

Brakes

TRAINING MATERIALS

TRAINING MATERIALS FOR MPS TASKS—MOS 63G		TASKS BY EQUIPMENT		Brakes		FM		TM										VTR				COR. CRS.										SPAS			
1	Reline parking brake shoes	•	•	9-63G/C/M	9-2300-257-34	9-2300-378-35/1	9-2320-209-35	9-2320-218-34	9-2320-242-34	9-2320-260-34/1	9-2320-266-34	9-2350-217-34/1	9-2815-200-35	9-2815-202-34	9-2815-205-34	9-2815-210-35	9-2910-212-34	610-091-0096	610-091-0653	610-091-0654	610-091-0655	610-091-0656	ODO402	ODO403	ODO404	ODO410	ODO412	H-B6303	H-B6304	H-B6308	610-091-9054-Y	610-091-9055-V	610-091-9055-Y	610-091-9056-S	
2	Inspect/classify air/hydraulic cylinder	•	•	9-63G1/2	9-2300-257-34	9-2300-378-35/1	9-2320-209-35	9-2320-218-34	9-2320-242-34	9-2320-260-34/1	9-2320-266-34	9-2350-217-34/1	9-2815-200-35	9-2815-202-34	9-2815-205-34	9-2815-210-35	9-2910-212-34	610-091-0096	610-091-0653	610-091-0654	610-091-0655	610-091-0656	ODO402	ODO403	ODO404	ODO410	ODO412	H-B6303	H-B6304	H-B6308	610-091-9054-Y	610-091-9055-V	610-091-9055-Y	610-091-9056-S	
3	Repair air/hydraulic cylinder	•	•	9-63G1/2	9-2300-257-34	9-2300-378-35/1	9-2320-209-35	9-2320-218-34	9-2320-242-34	9-2320-260-34/1	9-2320-266-34	9-2350-217-34/1	9-2815-200-35	9-2815-202-34	9-2815-205-34	9-2815-210-35	9-2910-212-34	610-091-0096	610-091-0653	610-091-0654	610-091-0655	610-091-0656	ODO402	ODO403	ODO404	ODO410	ODO412	H-B6303	H-B6304	H-B6308	610-091-9054-Y	610-091-9055-V	610-091-9055-Y	610-091-9056-S	
4	Inspect/classify service brake shoes	•	•	9-63G1/2	9-2300-257-34	9-2300-378-35/1	9-2320-209-35	9-2320-218-34	9-2320-242-34	9-2320-260-34/1	9-2320-266-34	9-2350-217-34/1	9-2815-200-35	9-2815-202-34	9-2815-205-34	9-2815-210-35	9-2910-212-34	610-091-0096	610-091-0653	610-091-0654	610-091-0655	610-091-0656	ODO402	ODO403	ODO404	ODO410	ODO412	H-B6303	H-B6304	H-B6308	610-091-9054-Y	610-091-9055-V	610-091-9055-Y	610-091-9056-S	
Carburetor		•	•	9-63G1/2	9-2300-257-34	9-2300-378-35/1	9-2320-209-35	9-2320-218-34	9-2320-242-34	9-2320-260-34/1	9-2320-266-34	9-2350-217-34/1	9-2815-200-35	9-2815-202-34	9-2815-205-34	9-2815-210-35	9-2910-212-34	610-091-0096	610-091-0653	610-091-0654	610-091-0655	610-091-0656	ODO402	ODO403	ODO404	ODO410	ODO412	H-B6303	H-B6304	H-B6308	610-091-9054-Y	610-091-9055-V	610-091-9055-Y	610-091-9056-S	
1	Inspect carburetors	•	•	9-63G1/2	9-2300-257-34	9-2300-378-35/1	9-2320-209-35	9-2320-218-34	9-2320-242-34	9-2320-260-34/1	9-2320-266-34	9-2350-217-34/1	9-2815-200-35	9-2815-202-34	9-2815-205-34	9-2815-210-35	9-2910-212-34	610-091-0096	610-091-0653	610-091-0654	610-091-0655	610-091-0656	ODO402	ODO403	ODO404	ODO410	ODO412	H-B6303	H-B6304	H-B6308	610-091-9054-Y	610-091-9055-V	610-091-9055-Y	610-091-9056-S	
2	Repair carburetors	•	•	9-63G1/2	9-2300-257-34	9-2300-378-35/1	9-2320-209-35	9-2320-218-34	9-2320-242-34	9-2320-260-34/1	9-2320-266-34	9-2350-217-34/1	9-2815-200-35	9-2815-202-34	9-2815-205-34	9-2815-210-35	9-2910-212-34	610-091-0096	610-091-0653	610-091-0654	610-091-0655	610-091-0656	ODO402	ODO403	ODO404	ODO410	ODO412	H-B6303	H-B6304	H-B6308	610-091-9054-Y	610-091-9055-V	610-091-9055-Y	610-091-9056-S	
Distributor		•	•	9-63G1/2	9-2300-257-34	9-2300-378-35/1	9-2320-209-35	9-2320-218-34	9-2320-242-34	9-2320-260-34/1	9-2320-266-34	9-2350-217-34/1	9-2815-200-35	9-2815-202-34	9-2815-205-34	9-2815-210-35	9-2910-212-34	610-091-0096	610-091-0653	610-091-0654	610-091-0655	610-091-0656	ODO402	ODO403	ODO404	ODO410	ODO412	H-B6303	H-B6304	H-B6308	610-091-9054-Y	610-091-9055-V	610-091-9055-Y	610-091-9056-S	
1	Inspect distributor	•	•	9-63G1/2	9-2300-257-34	9-2300-378-35/1	9-2320-209-35	9-2320-218-34	9-2320-242-34	9-2320-260-34/1	9-2320-266-34	9-2350-217-34/1	9-2815-200-35	9-2815-202-34	9-2815-205-34	9-2815-210-35	9-2910-212-34	610-091-0096	610-091-0653	610-091-0654	610-091-0655	610-091-0656	ODO402	ODO403	ODO404	ODO410	ODO412	H-B6303	H-B6304	H-B6308	610-091-9054-Y	610-091-9055-V	610-091-9055-Y	610-091-9056-S	
2	Repair distributor	•	•	9-63G1/2	9-2300-257-34	9-2300-378-35/1	9-2320-209-35	9-2320-218-34	9-2320-242-34	9-2320-260-34/1	9-2320-266-34	9-2350-217-34/1	9-2815-200-35	9-2815-202-34	9-2815-205-34	9-2815-210-35	9-2910-212-34	610-091-0096	610-091-0653	610-091-0654	610-091-0655	610-091-0656	ODO402	ODO403	ODO404	ODO410	ODO412	H-B6303	H-B6304	H-B6308	610-091-9054-Y	610-091-9055-V	610-091-9055-Y	610-091-9056-S	
Fuel Pump		•	•	9-63G1/2	9-2300-257-34	9-2300-378-35/1	9-2320-209-35	9-2320-218-34	9-2320-242-34	9-2320-260-34/1	9-2320-266-34	9-2350-217-34/1	9-2815-200-35	9-2815-202-34	9-2815-205-34	9-2815-210-35	9-2910-212-34	610-091-0096	610-091-0653	610-091-0654	610-091-0655	610-091-0656	ODO402	ODO403	ODO404	ODO410	ODO412	H-B6303	H-B6304	H-B6308	610-091-9054-Y	610-091-9055-V	610-091-9055-Y	610-091-9056-S	
1	Inspect fuel injector pump	•	•	9-63G1/2	9-2300-257-34	9-2300-378-35/1	9-2320-209-35	9-2320-218-34	9-2320-242-34	9-2320-260-34/1	9-2320-266-34	9-2350-217-34/1	9-2815-200-35	9-2815-202-34	9-2815-205-34	9-2815-210-35	9-2910-212-34	610-091-0096	610-091-0653	610-091-0654	610-091-0655	610-091-0656	ODO402	ODO403	ODO404	ODO410	ODO412	H-B6303	H-B6304	H-B6308	610-091-9054-Y	610-091-9055-V	610-091-9055-Y	610-091-9056-S	
2	Repair fuel injector pump	•	•	9-63G1/2	9-2300-257-34	9-2300-378-35/1	9-2320-209-35	9-2320-218-34	9-2320-242-34	9-2320-260-34/1	9-2320-266-34	9-2350-217-34/1	9-2815-200-35	9-2815-202-34	9-2815-205-34	9-2815-210-35	9-2910-212-34	610-091-0096	610-091-0653	610-091-0654	610-091-0655	610-091-0656	ODO402	ODO403	ODO404	ODO410	ODO412	H-B6303	H-B6304	H-B6308	610-091-9054-Y	610-091-9055-V	610-091-9055-Y	610-091-9056-S	
3	Repair fuel supply pump	•	•	9-63G1/2	9-2300-257-34	9-2300-378-35/1	9-2320-209-35	9-2320-218-34	9-2320-242-34	9-2320-260-34/1	9-2320-266-34	9-2350-217-34/1	9-2815-200-35	9-2815-202-34	9-2815-205-34	9-2815-210-35	9-2910-212-34	610-091-0096	610-091-0653	610-091-0654	610-091-0655	610-091-0656	ODO402	ODO403	ODO404	ODO410	ODO412	H-B6303	H-B6304	H-B6308	610-091-9054-Y	610-091-9055-V	610-091-9055-Y	610-091-9056-S	

# TRAINING MATERIALS

## TRAINING MATERIALS FOR

MPS TASKS—MOS 63G

## TASKS BY EQUIPMENT

	FM	TECHNICAL MANUALS	TEC	VTR	COR. CRS.	SPAS
Injector Nozzle	9-63G/CM	9-2300-257-34 9-2300-378-35/1 9-2320-209-35 9-2320-218-34 9-2320-242-34 9-2320-260-34/1 9-2320-266-34 9-2350-217-34/1 9-2815-200-35 9-2815-202-34 9-2815-205-34 9-2815-210-35 9-2920-224-35 9-2920-225-34 9-2920-242-35 9-2920-247-34 9-2920-248-35 9-2920-252-34 9-4910-485-12 11-6625-366-10	101-113-4775 101-113-4776 101-113-4777 610-091-6060 610-091-6061 610-091-6062 610-091-6065 610-091-6066	610-091-0112 610-091-0577 610-091-0579 610-091-0580 610-091-0581 610-091-0637 610-091-0787	ODO082 ODO402 ODO404 ODO412 ODO727 HB6303 SS9448	610-091-9054-Y 610-091-9055-Y 610-091-9056-S
1 Inspect fuel injector nozzle	•	•	•	•	•	•
2 Repair fuel injector nozzle	•	•	•	•	•	•
Generator/Alternator	•	•	•	•	•	•
1 Inspect generator/alternator	•	•	•	•	•	•
2 Repair generator/alternator	•	•	•	•	•	•
Regulator/Control Box	•	•	•	•	•	•
1 Inspect regulator	•	•	•	•	•	•
2 Inspect control box	•	•	•	•	•	•
3 Repair control box	•	•	•	•	•	•
4 Adjust regulator	•	•	•	•	•	•
Starter	•	•	•	•	•	•
1 Inspect starter	•	•	•	•	•	•
2 Repair starter	•	•	•	•	•	•



## MPS TASKS AND KEY STEPS BY EQUIPMENT FOR MOS 636

### BRAKES

MPS Task	Key Steps
1. RELINE PARKING BRAKE SHOES (SM 091-477-1001)	<ul style="list-style-type: none"><li>a. Remove rivets and lining from brake shoes</li><li>b. Clean and inspect shoes</li><li>c. Install new lining on shoe</li><li>d. Check contact of lining with shoe</li></ul>
2. INSPECT/CLASSIFY/AIR/HYDRAULIC CYLINDER	<ul style="list-style-type: none"><li>a. Remove master cylinder and front and rear piston assembly</li><li>b. Clean cylinder body</li><li>c. Inspect cylinder bore walls</li><li>d. Inspect front and rear piston assembly</li><li>e. Record deficiencies</li></ul>
3. REPAIR AIR/HYDRAULIC CYLINDER (SM 091-477-1004)	<ul style="list-style-type: none"><li>a. Remove tube, elbow, double check valve, and separate</li><li>b. Separate slave cylinder tube from end plate</li><li>c. Remove piston pin, check valve, and check valve seal from piston rod</li><li>d. Separate end plate, helical spring and piston rod</li><li>e. Disassemble piston</li><li>f. Remove control valve poppet body, diaphragm and adapter assemblies</li><li>g. Remove and separate diaphragm and adapter assembly</li><li>h. Disassemble end plate</li><li>i. Disassemble slave cylinder</li><li>j. Disassemble double check valve</li><li>k. Clean and inspect metal parts</li><li>l. Install new packing</li><li>m. Reassemble air/hydraulic cylinder in reverse order with rebuild kit parts</li></ul>
4. INSPECT/CLASSIFY/SERVICE BRAKE SHOES	<ul style="list-style-type: none"><li>a. Clean brake drums</li><li>b. Visually inspect drums for defects or damage</li><li>c. Inspect internal drum diameter</li><li>d. Record deficiencies</li></ul>

## **CARBURETOR**

### **1. INSPECT CARBURETOR**

- a. Remove cover
- b. Inspect for wear or defects:
  1. Float, lever arm and float shaft
  2. Needle valve and valve seat
  3. Idle adjusting needle
  4. Idle tube and main well tube
  5. Choke plate, choke shaft, throttle plate and throttle shaft
  6. Main body for cracks, dents or other damage
- c. Replace cover
- d. Record deficiencies

### **2. REPAIR CARBURETOR (SM 091-477-1011)**

- a. Disassemble by removing:
  1. Brass air valve, seat and spring from air horn
  2. Clip and accelerator pump arm link
  3. Piston assembly
  4. Vacuum hose, choke vacuum diaphragm, linkage and bracket from carburetor body
  5. Fast-idle cam and linkage
  6. Air horn
  7. "S" link from pump assembly
  8. Inlet needle valve, seat and gasket
  9. Float retainer, baffle, floatpin, float and main metering jet
  10. Venturi cluster assembly
  11. Accelerator pump and intake check balls
  12. Limiter caps from idle mixture screws and springs
- b. Clean all metal parts and check for excessive wear
- c. Install repair parts
- d. Adjust float to proper measurement
- e. Reassemble carburetor in reverse order

## **DISTRIBUTOR**

### **1. INSPECT DISTRIBUTOR (SM 091-477-2020)**

- a. Remove and inspect distributor cap and rotor
- b. Inspect distributor shaft

## INSPECT DISTRIBUTOR (CONTINUED)

### 2. REPAIR DISTRIBUTOR (SM 091-477-1017)

- c. Inspect for missing hardware
- d. Inspect distributor vacuum control
- e. Inspect distributor housing for defects
- f. Record deficiencies
- a. Disassemble the distributor by removing:
  1. Distributor cap and rotor
  3. Vacuum control
  4. Plate, upper plate, pickup coil
  5. Shaft assembly
- b. Inspect and replace worn or defective parts
- c. Lubricate distributor assembly
- d. Reassemble in reverse order of removal

## FUEL PUMP

### 1. INSPECT FUEL INJECTOR PUMP (SM 091-477-2048)

- a. Cover hydraulic head fuel outlet ports
- b. Clean external surface
- c. Check all nuts, capscrews, bolts, slotted screws, fittings and connections
- d. Check pump linkages and controls
- e. Check camshaft
- f. Record deficiencies

### 2. REPAIR FUEL INJECTOR PUMP (PSB12) (SM 091-477-1037)

- a. Disassemble injector pump
- b. Clean all parts
- c. Inspect and replace defective parts
- d. Reassemble pump in reverse order of disassembly

### 3. REPAIR FUEL SUPPLY PUMP (SM 091-477-1038)

- a. Disassemble fuel pump
- b. Clean, inspect and repair or replace defective or unserviceable components
- c. Reassemble fuel pump in reverse order of disassembly

## INJECTOR NOZZLE

### 1. INSPECT FUEL INJECTOR NOZZLE (SM 091-477-2058 SM 091-477-2059)

- a. Inspect for heat discoloration
- b. Inspect for orifice erosion
- c. Inspect for deterioration of preformed packing

**INSPECT FUEL INJECTOR NOZZLE  
(CONTINUED)**

**2. REPAIR FUEL INJECTOR NOZZLE  
(SM 091-477-1057)**

- d. Inspect inlet and outlet thread connections
- e. Inspect holder assembly and nozzle for damage
- f. Record deficiencies
- a. Install injector nozzle and holder assembly in nozzle tester
- b. Adjust opening pressure
- c. Check nozzle leakage
- d. Check and adjust, if applicable, nozzle spray pattern
- e. Clean nozzle assembly
- f. Inspect nozzle assembly

**GENERATOR/ALTERNATOR**

**1. INSPECT GENERATOR/ALTERNATOR  
(SM 091-477-2067)**

- a. Inspect for wear or defects:
  - 1. Fan vanes
  - 2. End housing
- b. Inspect for stripped threads
- c. Inspect for loose or frayed insulation
- d. Inspect for loose connections or damage
- e. Record deficiencies

**2. REPAIR GENERATOR/ALTERNATOR  
(SM 091-477-1078  
SM 091-477-1079  
SM 091-477-1081  
SM 091-477-1093)**

- a. Disassemble alternator by removing:
  - 1. Nut, washer and woodruff key from rotor shaft
  - 2. Output switch access plug from voltage regulator
  - 3. Voltage regulator and preformed packing from end housing
  - 4. Terminal lead cover
  - 5. Sealant, stator leads between stator assembly and terminal and lead assembly
  - 6. End housing screws and lockwashers from intermediate housing
  - 7. Brush holder
  - 8. Brushes and springs from holder
  - 9. Terminal leads and leads assembly from diodes rectifier mounts, pins on socket terminal assembly and output strap from bottom of output terminal
  - 10. Rectifier mounts and insulator from end housing

REPAIR GENERATOR/ALTERNATOR  
(CONTINUED)

11. Socket terminal from end housing
12. Terminal, leads and preformed packing from end housing
13. Preformed packing and retaining ring from intermediate housing
14. Intermediate housing
15. Retainer; separate preformed packing sleeve spacer seal, preformed packing and sleeve spacer from bearing retainer and end housing
16. Stator assembly, ball bearing and tip seal from rotor and fan assembly shaft
17. Lip seal, felt retainer, felt washer, and felt retainer from intermediate housing
18. Slip rings from rotor and fan assemblies shaft
18. Slip rings from rotor and fan assemblies shaft
19. Solder bearing outer race and inner race from rotor shaft
- b. Clean all parts:
  1. Stator assembly, rotor, brush holder with cleaning solvent dampened cloth
  2. All other metal parts with solvent
  3. Dry thoroughly
- c. Inspect the following:
  1. Fan vanes for cracks or damage
  2. Hub and clutch for stripped threads, worn keyway and weak, worn or distorted springs
  3. Bearing retainers for cracks or damage
  4. End housing for cracks and damage; bearing bore and mating face
  5. Bearings
  6. Brush holder for cracks; terminal studs and screws for looseness and damaged threads
  7. Brush levers for distortion and damage

**REPAIR GENERATOR/ALTERNATOR  
(CONTINUED)**

8. Brush lever springs for cracks and distortion; test spring tension
9. Stator assembly for stripped threads in housing, loose/frayed insulation, connector for damaged or loose pins; perform continuity test between pin and stator housing
10. Rotor keys and key seats for damage, shaft for burred or stripped threads; perform resistance test on inner and outer slip rings
11. Slip rings for distortion
12. Rotor shaft and each slip ring for proper ground
13. Flexible coupling shaft for wear, holder and cover for cracks, blocks for wear, distortion and resiliency loss
14. Screws for stripped threads and damaged heads
15. Rectifiers for shorts
- d. Replace damaged or defective parts in reverse order of disassembly
- e. Reassemble generator/alternator in reverse order of removal

**REGULATOR/CONTROL BOX**

1. INSPECT REGULATOR  
(SM 091-477-2090)
2. INSPECT CONTROL BOX
3. REPAIR CONTROL BOX

- a. Inspect electrical connectors
  - b. Inspect regulator top cover
  - c. Check for missing and damaged hardware
  - d. Inspect regulator housing assembly
  - e. Record deficiencies
- a. Inspect electrical connectors
  - b. Inspect control box cover
  - c. Check for missing and damaged hardware
  - d. Inspect control box housing
  - e. Record deficiencies
- a. Peak voltage 12 to 32 volts
  - b. Adjust operating voltage
  - c. Adjust 4-volt span
  - d. Test polarized voltage relay

## REPAIR CONTROL BOX (CONTINUED)

- e. Test and adjust differential and reverse current relay
- f. Conduct reverse current test
- g. Conduct shock test

## STARTER

### 1. INSPECT STARTER

- a. Disassemble starter
- b. Inspect for damage or defects:
  - 1. Frame and field coil assembly
  - 2. Armature and armature shaft
  - 3. Commutator end head and bush plate
  - 4. Drive end head
  - 5. Starter drive
  - 6. Miscellaneous parts, screws, etc.
- c. Reassemble in reverse order
- d. Record deficiencies

### 2. REPAIR STARTER (SM 091-477-1121 SN 091-477-1124)

- a. Disassemble starter
- b. Disassemble brush plate assembly and gear house assembly
- c. Clean and inspect all parts for damage or wear
- d. Test the armature
- e. Repair or replace defective or worn parts
- f. Reassemble starter in reverse order of removal

# TRAINING MATERIALS

## TRAINING MATERIALS FOR

MPS TASKS—MOS 63H

TASKS BY EQUIPMENT

### M60 Family

	FM	TM	TEC	COR. CRS.	SPAS
1	9-63H/CM	9-2300-257-20 9-2300-257-34 9-2300-378-35/1 9-2350-215-20 9-2350-222-20 9-2350-257-34/1 9-2520-223-34 9-2520-236-34 9-2520-254-34 9-2815-200-35 9-2815-205-34 9-2815-220-34	610-091-6259 610-091-6260 610-091-6262 610-091-6263 610-091-6264 610-091-6265 610-091-6267 610-091-6268 610-091-6269 610-091-6270 611-091-6103 611-091-6104 611-091-6105 611-091-6106	ODO402 ODO403 ODO412 ODO420 ODO531 ODO607 ODO729	610-091-9060-Y 610-091-9061-Y 610-091-9062-H 610-091-9063-H 610-091-9066-H
1	Replace engine/transmission (split pack)				
2	Replace fuel injector nozzle				
3	Replace fuel injector pump				
4	Replace fuel tank				
5	Replace turbocharger				
M113 Family					
1	Replace engine/transmission/transfer (split pack)				
2	Replace cylinder head				
3	Replace fuel injector nozzle				
4	Adjust fuel injector rack control				
5	Adjust governor				
6	Replace engine air blower				



# TRAINING MATERIALS FOR

MPS TASKS—MOS 63H

## TASKS BY EQUIPMENT

M109/M578

# TRAINING MATERIALS

	FM	TM	TEC	COR. CRS.
1 Replace engine/transmission/transfer (split pack)	9-63H/CM	9-2350-217-20 9-2350-217-34/1 9-2350-238-20 9-2350-238-34/1 9-2350-256-20 9-2350-256-34/1 9-2805-206-35 9-2815-202-34	610-091-6259 610-091-6260 610-091-6262 610-091-6263 610-091-6264 610-091-6265 610-091-6267 610-091-6268 610-091-6269 610-091-6270	ODO402 ODO403 ODO412 ODO420 ODO531 ODO607 ODO729
2 Replace cylinder head				
3 Replace fuel injector nozzle				
4 Adjust fuel injector rack control				
5 Replace turbocharger				
6 Replace governor				
M58A1				
1 Replace engine/transmission (split pack)				
2 Replace turbosupercharger				
3 Replace transmission oil cooler				

## MPS TASKS AND KEY STEPS BY EQUIPMENT FOR MOS 63H

### M60 FAMILY

MPS Task	Key Steps
1. REPLACE ENGINE/TRANSMISSION (SPLIT PACK) (SM 091-478-1001)	<ul style="list-style-type: none"><li>a. Remove all common hardware</li><li>b. Remove shroud</li><li>c. Remove steering controls and linkage</li><li>d. Remove transmission input shaft</li><li>e. Disconnect tubes and lines</li><li>f. Disconnect and tag wiring harness</li><li>g. Attach sling</li><li>h. Remove mounting bolts</li><li>i. Separate and replace defective assembly</li><li>j. Install in reverse order</li></ul>
2. REPLACE FUEL INJECTOR NOZZLE (SM 091-478-1013)	<ul style="list-style-type: none"><li>a. Disconnect inlet and outlet hoses</li><li>b. Remove connector and bolt</li><li>c. Remove gaskets</li><li>d. Remove two cylinder head shroud plates</li><li>e. Remove nozzle</li><li>f. Install replacement in reverse order</li></ul>
3. REPLACE FUEL INJECTOR PUMP (SM 091-478-1014)	<ul style="list-style-type: none"><li>a. Disconnect injector tubes</li><li>b. Disconnect electrical lead and all hoses</li><li>c. Remove check valve</li><li>d. Disconnect rods and bracket</li><li>e. Remove fans</li><li>f. Remove pump</li><li>g. Time replacement pump</li><li>h. Set engine timing</li><li>i. Install in reverse order</li><li>j. Torque bolts to TM specifications</li></ul>
4. REPLACE FUEL TANK	<ul style="list-style-type: none"><li>a. Drain fuel</li><li>b. Remove pipes and hoses</li><li>c. Remove fuel tank</li><li>d. Install replacement tank</li><li>e. Install lines and hoses</li><li>f. Fill and test</li></ul>

**5. REPLACE TURBOCHARGER  
(SM 091-478-1015)**

- a. Remove shroud plates
- b. Disconnect hoses
- c. Remove air outlet elbow
- d. Separate exhaust pipes
- e. Remove turbocharger
- f. Transfer common hardware
- g. Install replacement in reverse order

**M113 FAMILY**

**1. REPLACE ENGINE/TRANSMISSION/  
TRANSFER (SPLIT PACK)  
(SM 091-478-1123)**

- a. Disconnect hoses
- b. Remove oil filter and bracket
- c. Disconnect wiring harness
- d. Remove linkage
- e. Remove lines and tubes
- f. Remove access plate and bolts
- g. Attach sling
- h. Remove mounting bolts
- i. Separate and replace defective assembly
- j. Install in reverse order

**2. REPLACE CYLINDER HEAD**

- a. Remove cover
- b. Disconnect rack arm pin and governor arm
- c. Remove fuel injector rack and lines
- d. Remove cylinder head and inspect
- e. Remove and replace gasket
- f. Install cylinder head
- g. Torque bolts
- h. Install fuel injector rack and lines
- i. Connect governor arm and rack arm pin
- j. Adjust valve clearance
- k. Adjust rack and governor
- l. Install cover

**3. REPLACE FUEL INJECTOR NOZZLE**

- a. Remove valve covers
- b. Disconnect inlet and outlet tubes
- c. Disconnect rocker arms
- d. Remove injector nozzle
- e. Install injector nozzle
- f. Connect components in reverse order

REPLACE FUEL INJECTOR NOZZLE  
(CONTINUED)

4. ADJUST FUEL INJECTOR RACK  
CONTROL  
(SM 091-478-2139)

- g. Time injectors
- h. Adjust rack and governor
- i. Install valve covers

5. ADJUST GOVERNOR  
(SM 091-478-2141)

- a. Disconnect control link
- b. Loosen adjusting screws
- c. Hold governor speed control lever in maximum forward position
- d. Adjust rack
- e. Tighten screws
- f. Connect control link
- g. Adjust governor idle speed screw

6. REPLACE ENGINE AIR BLOWER

- a. Run engine to operating temperature
- b. Remove cover
- c. Adjust governor
- d. Install cover

- a. Disconnect electrical leads
- b. Disconnect hose
- c. Remove governor control rods
- d. Remove blower
- e. Install replacement in reverse order
- f. Adjust governor control rods

M109/M578

1. REPLACE ENGINE/TRANSMISSION/  
TRANSFER (SPLIT PACK)  
(SM 091-478-1050  
SM 091-478-1078)

- a. Remove oil and fuel lines
- b. Disconnect wiring harness
- c. Remove inlet tube
- d. Disconnect coolant hose
- e. Attach sling
- f. Disconnect tie bar
- g. Remove mounting bolts
- h. Separate and replace defective assembly
- i. Install in reverse order

2. REPLACE CYLINDER HEAD

- a. Remove cover
- b. Remove rocker arm assembly
- c. Remove push rods
- d. Remove manifold
- e. Remove gasket and head
- f. Install new gasket and head
- g. Torque bolts
- h. Install components in reverse order

**3. REPLACE FUEL INJECTOR NOZZLE**

- a. Remove valve covers
- b. Disconnect inlet and outlet tubes
- c. Disconnect rocker arms
- d. Remove injector nozzle
- e. Install injector nozzle
- f. Connect components in reverse order
- g. Time injectors
- h. Adjust racks and governor
- i. Install valve covers

**4. ADJUST FUEL INJECTOR RACK CONTROL**

- a. Remove rocker arm cover
- b. Remove idle screws and tube pin
- c. Loosen rack adjusting screws
- d. Adjust rack
- e. Tighten rack adjusting screws
- f. Install components in reverse order

**5. REPLACE TURBOCHARGER  
(SM 091-478-1061)**

- a. Remove lines and hoses
- b. Remove mounting bolts
- c. Remove turbocharger
- d. Install replacement
- e. Install components in reverse order

**6. REPLACE GOVERNOR**

- a. Remove water tubes
- b. Remove fuel pump
- c. Loosen lines and clamps
- d. Remove covers
- e. Disconnect control rods
- f. Remove and separate blower and governor
- g. Replace governor
- h. Install in reverse order

**M88A1**

**1. REPLACE ENGINE/TRANSMISSION  
(SPLIT PACK)**

- a. Remove oil and fuel lines
- b. Disconnect wiring harness
- c. Remove linkage
- d. Attach sling
- e. Remove mounting bolts
- f. Separate and replace defective assembly
- g. Install in reverse order

2. REPLACE TURBOSUPERCHARGER

- a. Disconnect hoses
- b. Separate exhaust pipes
- c. Remove turbosupercharger
- d. Transfer common hardware
- e. Install in reverse order

3. REPLACE TRANSMISSION OIL COOLER

- a. Disconnect lines
- b. Remove bolts
- c. Remove cooler
- d. Install in reverse order

# TRAINING MATERIALS FOR

MPS TASKS—MOS 63W

## TASKS BY EQUIPMENT

### M151 Family

## TRAINING MATERIALS

	FM	TM	TEC	COR. CRS.	SPAS
1 Replace engine/transmission/transfer	9-63W/CM	9-2320-218-20	610-091-6086	OD0402	610-091-9252-H
2 Replace cylinder head	•	9-2320-218-34	610-091-6251	OD0403	610-091-9253-H
3 Replace oil pump	•	9-2320-242-34	610-091-6252	OD0404	610-091-9254-H
4 Replace clutch	•	9-2320-266-20	610-091-6253	OD0405	610-091-9255-H
Gamma Goat (M561)		9-2320-266-34	610-091-6259	OD0406	610-091-9256-H
1 Replace engine/transmission				OD0531	610-091-9257-H
2 Replace clutch				OD0607	610-091-9258-H
3 Replace transfer	•			OD0726	610-091-9259-H
4 Replace front/rear differential				OD0730	610-091-9260-H
5 Replace center differential				OD0730	610-091-9261-H
M880 Family				OD0730	610-091-9262-H
1 Replace engine				OD0730	610-091-9263-H
2 Replace transmission				OD0730	610-091-9264-H
3 Replace transfer				OD0730	610-091-9265-H
4 Replace differential/rear axle	•			OD0730	610-091-9266-H
5 Replace steering gear	•			OD0730	610-091-9267-H

# TRAINING MATERIALS

## TRAINING MATERIALS FOR

MPS TASKS—MOS 63W

TASKS BY EQUIPMENT

2.5/5 Ton M Series

	FM	TM	TEC	COR. CRS.	SPAS
1 Replace engine/transmission	9-63W/CM	9-2320-209-20	610-091-6086	ODO402	610-091-9200-H
2 Replace cylinder head		9-2320-209-35	610-091-6251	ODO403	610-091-9204-H
3 Replace fuel injector nozzle		9-2320-260-34/2	610-091-6252	ODO404	610-091-9205-H
4 Replace fuel injector pump		9-2320-260-34/2	610-091-6253	ODO405	610-091-9231-H
5 Replace flywheel		9-2320-260-34/2	610-091-6259	ODO406	610-091-9232-H
6 Replace transfer		9-2320-260-34/2	610-091-6260	ODO407	610-091-9270-Y
7 Replace clutch		9-2320-260-34/2	610-091-6262	ODO408	610-091-9271-Y
8 Replace turbocharger		9-2320-260-34/2	610-091-6263	ODO409	
9 Replace front axle		9-2320-260-34/2	610-091-6264	ODO410	
10 Replace rear axle		9-2320-260-34/2	610-091-6265	ODO411	
11 Replace steering gear		9-2320-260-34/2	610-091-6266	ODO412	
12 Replace power steering pump (5 ton only)		9-2320-260-34/2	610-091-6267	ODO413	
			610-091-6268	ODO414	
			610-091-6269	ODO415	
			610-091-6270	ODO416	
			610-091-6271	ODO417	
			610-091-6272	ODO418	
			610-091-6273	ODO419	
			610-091-6274	ODO420	
			610-091-6275	ODO421	
			610-091-6276	ODO422	
			610-091-6277	ODO423	
			610-091-6278	ODO424	
			610-091-6279	ODO425	
			610-091-6280	ODO426	
			610-091-6281	ODO427	
			610-091-6282	ODO428	
			610-091-6283	ODO429	
			610-091-6284	ODO430	
			610-091-6285	ODO431	
			610-091-6286	ODO432	
			610-091-6287	ODO433	
			610-091-6288	ODO434	
			610-091-6289	ODO435	
			610-091-6290	ODO436	
			610-091-6291	ODO437	
			610-091-6292	ODO438	
			610-091-6293	ODO439	
			610-091-6294	ODO440	
			610-091-6295	ODO441	
			610-091-6296	ODO442	
			610-091-6297	ODO443	
			610-091-6298	ODO444	
			610-091-6299	ODO445	
			610-091-6300	ODO446	
			610-091-6301	ODO447	
			610-091-6302	ODO448	
			610-091-6303	ODO449	
			610-091-6304	ODO450	
			610-091-6305	ODO451	
			610-091-6306	ODO452	
			610-091-6307	ODO453	
			610-091-6308	ODO454	



## MPS TASKS AND KEY STEPS BY EQUIPMENT FOR MOS 63W

### W151 FAMILY

MPS Task	Key Steps
1. REPLACE ENGINE/TRANSMISSION/ TRANSFER	<ol style="list-style-type: none"><li>Remove grill and radiator</li><li>Disconnect fuel, air and electrical lines and cables</li><li>Disconnect propeller shafts</li><li>Remove cover and shifting levers</li><li>Disconnect mounting bolts</li><li>Remove power plant</li><li>Remove connecting bolts</li><li>Separate assemblies</li><li>Transfer components to replacement assembly</li><li>Install in reverse order</li></ol>
2. REPLACE CYLINDER HEAD (SM 091-480-1003)	<ol style="list-style-type: none"><li>Drain cooling system</li><li>Remove carburetor, manifolds and thermostat</li><li>Remove rocker arm cover</li><li>Remove rocker arm assembly</li><li>Remove spark plugs</li><li>Remove push rods</li><li>Remove cylinder head and gasket</li><li>Install in reverse order</li><li>Torque bolts to TM specification</li></ol>
3. REPLACE OIL PUMP	<ol style="list-style-type: none"><li>Remove grill and radiator</li><li>Disconnect fuel, air and electrical lines and cables</li><li>Disconnect propeller shafts</li><li>Remove cover and shifting levers</li><li>Disconnect mounting bolts</li><li>Remove power plant</li><li>Remove oil pan</li><li>Check and record gear backlash</li><li>Remove retaining bolts</li><li>Remove oil pump and gasket</li><li>Install gasket and replacement pump</li><li>Check gear backlash</li><li>Install components in reverse order</li></ol>

#### **4. REPLACE CLUTCH**

- a. Remove grill and radiator
- b. Disconnect fuel, air, and electrical lines and cables
- c. Disconnect propeller shafts
- d. Remove cover and shifting levers
- e. Disconnect mounting bolts
- f. Remove power plant
- g. Remove connecting bolts
- h. Separate engine and transmission
- i. Remove pressure plate and clutch
- j. Install in reverse order

#### **6MM GOAT**

#### **1. REPLACE ENGINE/TRANSMISSION**

- a. Open engine cover and secure
- b. Unfasten tractor canopy and fold canopy over windshield
- c. Remove tractor seats
- d. Remove console
- e. Remove canopy retainer strip
- f. Disconnect negative battery ground terminal
- g. Remove exhaust header pipe and clamps
- h. Remove surge tank overflow drain hose
- i. Disconnect air restriction indicator line
- j. Remove clutch control rod for clutch fork
- k. Remove transmission output flange from coupling assembly
- l. Remove shift control rod from transmission
- m. Remove selector control rod from transmission
- n. Remove accelerator rod from engine bell crank
- o. Remove engine stop cable from governor
- p. Remove drain tube from engine air box
- q. Remove hardware steady rest support to tractor
- r. Disconnect fuel lines
- s. Tag and disconnect main wiring harness
- t. Attach lifting sling
- u. Disconnect mounting bolts

**REPLACE ENGINE/TRANSMISSION  
(CONTINUED)**

**2. REPLACE CLUTCH**

**3. REPLACE TRANSFER  
(SM 091-480-1171)**

**4. REPLACE FRONT/REAR DIFFERENTIAL**

- v. Remove power plant
  - w. Separate engine and transmission
  - x. Transfer components to replacement assembly
  - y. Install in reverse order
- 
- a. Drop transmission/engine and separate
  - b. Remove pressure plate bolts
  - c. Remove pressure plate and clutch disc
  - d. Replace defective components
  - e. Install in reverse order
- 
- a. Remove tractor seats
  - b. Remove console
  - c. Remove transmission to transfer case coupling assembly
  - d. Remove transmission shift control assembly
  - e. Remove parking brake lever
  - f. Remove winch
  - g. Disconnect speedometer shaft at transfer
  - h. Disconnect accelerator cable
  - i. Remove transmission stop angle
  - j. Remove transmission upper steady rest pad
  - k. Disconnect tractor propeller shaft at transfer case
  - l. Put transfer case in 6 wheel drive
  - m. Disconnect transfer case from front differential
  - n. Install lifting sling
  - o. Remove transfer case
  - p. Install in reverse order
- 
- a. Place transfer case in 6 wheel drive
  - b. Raise front or rear of vehicle
  - c. Drain lubricants from differential and transfer case
  - d. Disconnect axle assembly
  - e. Disconnect vent lines
  - f. Remove differential
  - g. Install in reverse order

## 5. REPLACE CENTER DIFFERENTIAL

- a. Disconnect hydraulic, air and electrical lines between tractor and carrier
- b. Remove screws and nuts securing hitch pins in yoke and drive out pins
- c. Disconnect center steering shaft for tractor steering yoke
- d. Disconnect center steering bearing from center differential
- e. Remove tractor hull access panel
- f. Disconnect link assembly from shaft linkage
- g. Disconnect link assembly from center differential
- h. Remove wheels and tires
- i. Disconnect shock absorbers
- j. Remove bolts securing upper and lower support assemblies to tractor frame
- k. Disconnect vent lines
- l. Remove center differential
- m. Install in reverse order

## MB80 FAMILY

### 1. REPLACE ENGINE

- a. Remove grill and radiator
- b. Disconnect fuel, air and electrical lines and cables
- c. Disconnect transmission
- d. Disconnect mounting bolts
- e. Remove engine
- f. Transfer components to replacement
- g. Install in reverse order

### 2. REPLACE TRANSMISSION

- a. Drain transmission
- b. Disconnect cooler lines
- c. Disconnect clutch linkage
- d. Disconnect propeller shaft
- e. Support on suitable lift
- f. Remove transmission
- g. Install in reverse order
- h. Service transmission

### 3. REPLACE TRANSFER

- a. Disconnect propeller shafts
- b. Disconnect rods and cables
- c. Drain transfer and support on lift
- d. Remove transfer

## REPLACE TRANSFER (CONTINUED)

### 4. REPLACE DIFFERENTIAL/REAR AXLE (SM 091-480-1085)

- e. Install in reverse order
- f. Service transfer
- a. Raise rear end and support on jack stands
- b. Disconnect parking brake cables
- c. Disconnect propeller shaft
- d. Remove shock absorbers and U-bolts
- e. Remove axle
- f. Install in reverse order
- g. Torque U-bolts and shock absorbers to specifications

### 5. REPLACE STEERING GEAR (SM 091-480-2234)

- a. Disconnect shaft
- b. Remove pitman arm
- c. Remove steering gear
- d. Install in reverse order

## 2.5/5 TON M SERIES

### 1. REPLACE ENGINE/TRANSMISSION (SM 091-480-1042)

- a. Remove grill and radiator
- b. Remove power steering pump (5 ton only)
- c. Disconnect fuel, air and electrical lines and cables
- d. Disconnect exhaust pipes
- e. Disconnect propeller shafts
- f. Disconnect linkages
- g. Remove mounting bolts and attach lift
- h. Remove power plant
- i. Separate engine and transmission
- j. Transfer components to replacement assembly
- k. Install in reverse order

### 2. REPLACE CYLINDER HEAD

- a. Remove rocker arm cover
- b. Remove rocker arm assembly
- c. Remove push rods
- d. Remove manifold
- e. Remove cylinder head and gasket
- f. Install in reverse order

### 3. REPLACE FUEL INJECTOR NOZZLE

- a. Disconnect inlet and outlet tubes
- b. Remove adapter bolt and adapter
- c. Remove injector nozzle

REPLACE FUEL INJECTOR NOZZLE  
(CONTINUED)

4. REPLACE FUEL INJECTOR PUMP  
(SM 091-480-2021)

- d. Install in reverse order
- e. Torque to specifications
- f. Time unit injector

5. REPLACE FLYWHEEL

- a. Remove injector lines, fittings and brackets
- b. Disconnect coupling
- c. Remove mounting bolts
- d. Remove fuel injector pump
- e. Time new fuel injector pump and engine
- f. Install in reverse order

6. REPLACE TRANSFER  
(SM 091-480-1226)

- a. Remove engine
- b. Remove clutch
- c. Remove flywheel bolts
- d. Remove flywheel
- e. Install in reverse order
- a. Disconnect propeller shafts
- b. Disconnect cables and linkage
- c. Drain transfer and support on suitable lift
- d. Remove transfer
- e. Transfer components to replacement
- f. Install in reverse order
- g. Adjust linkage

7. REPLACE CLUTCH  
(SM 091-480-1238)

- a. Drop transmission
- b. Remove pressure plate bolts
- c. Remove pressure plate and clutch
- d. Replace defective components
- e. Install in reverse order
- f. Adjust pressure plate finger

8. REPLACE TURBOCHARGER

- a. Disconnect exhaust pipe
- b. Remove hoses and lines
- c. Remove mounting bolts
- d. Remove turbocharger
- e. Install in reverse order

9. REPLACE FRONT AXLE  
(SM 091-480-1213)

- a. Support front of vehicle
- b. Remove wheel and support brake assembly
- c. Remove drive shaft
- d. Disconnect drag link
- e. Disconnect airbrake
- f. Disconnect shock absorbers and torque rod

REPLACE FRONT AXLE (CONTINUED)

- g. Remove axle
- h. Install in reverse order
- i. Torque to specifications
- j. Adjust brakes

10. REPLACE REAR AXLE

- a. Remove carrier and differential
- b. Remove hubs and brakes
- c. Remove axle and seals
- d. Install in reverse order
- e. Torque to specifications
- f. Adjust brakes

11. REPLACE STEERING GEAR

- a. Remove grill and radiator
- b. Remove power steering pump (5 ton only)
- c. Disconnect fuel, air and electrical lines and cables
- d. Disconnect exhaust pipes (2.5 ton)
- e. Disconnect linkages
- f. Remove power plant
- g. Remove mounting bolts
- h. Remove steering gear
- i. Install in reverse order

12. REPLACE POWER STEERING PUMP  
(5 TON ONLY)

- a. Disconnect hoses and drain pumps
- b. Remove mounting bolts
- c. Remove pump
- d. Install in reverse order
- e. Fill and service

## APPENDIX C

### DS UNIT MAINTENANCE TRAINING PUBLICATIONS AND MATERIALS

NUMBER	TITLE
<b>ARMY REGULATIONS (AR's)</b>	
1-24	Army Management Doctrine
1-65	Work Simplification
5-1	Army Management Doctrine
5-4	Dept. of the Army Product Improvement Program
140-15	Maintenance of Equipment
335-5	Standard Computation of Rates
350-1	Army Training
420-17	Work Management
420-82	Shop Facilities
710-2	Materiel Management for Using Units, Support Units, and Installations
725-50	Requisitioning, Receipt, and Issue System
750-1	Army Materiel Maintenance Concepts and Policies
750-5	Organization, Policies, and Responsibilities for Maintenance Operations
750-6	Maintenance Support Planning
750-51	Maintenance Assistance and Instruction Team Program
750-52	Equipment Operationally Ready Standards
<b>DA PAMPHLETS</b>	
1-54	Work Scheduling Techniques
5-2	Improvement Tools for Soldier Managers
5-2-1	MAP-TOE Manager's Handbook
5-2-2	MAP-TOE Instructor's Guide
5-3	Management Improvement Techniques for First Line Supervisors
5-4-1	Management Survey Handbook
5-4-6	Work Scheduling Handbook
108-1	Index of Army Motion Pictures and Related Audio-Visual Aids
310-1	Index of Administrative Publications
310-3	Index of Doctrinal Publications
310-4	Index of Technical Publications
310-12	Index and Description of Army Training Devices
350-37	SQT Handbook
351-20-5	Army Correspondence Course Program, USA Engineer Center
351-20-13	Army Correspondence Course Program, USA Ordnance Center
351-20-15	Army Correspondence Course Program, USA Signal Center
525-10	Combat Readiness
621-10	Army Skill Development Programs
700-1	Supply Management Handbook
700-2	Commander's Supply and Maintenance Handbook



**NUMBER****TITLE****DA PAMPHLETS (Continued)**

750-1	Maintenance Guide for Leaders
750-18	Commander's Maintenance Guide
750-22	Troubleshooting Equipment in Combat Units

**FIELD MANUALS (FM)**

5-52D/CM	Commander's Manual, MOS 52D, Power Generation Equipment Repairer
5-52D 1/2	Soldier's Manual, Skill Level 1/2, Power Generation Equipment Repairer
5-52D3	Soldier's Manual, Skill Level 3, Power Generation Equipment Repairer
9-41C/CM	Commander's Manual, MOS 41C, Fire Control Instrument Repairman
9-41C 1/2	Soldier's Manual, Skill Level 1/2, Fire Control Instrument Repairman
9-41C 3	Soldier's Manual, Skill Level 3, Fire Control Instrument Repairman
9-44B/CM	Commander's Manual, MOS 44B, Metalworker
9-44B 1/2	Soldier's Manual, Skill Level 1/2, Metalworker
9-44B 3	Soldier's Manual, Skill Level 3, Metalworker
9-45B/CM	Commander's Manual, MOS 45B, Small Arms Repairman
9-45B 1/2	Soldier's Manual, Skill Level 1/2, Small Arms Repairman
9-45K/CM	Commander's Manual, MOS 45K, Tank Turret Repairman
9-45K 1/2	Soldier's Manual, Skill Level 1/2, Tank Turret Repairman
9-45K 3	Soldier's Manual, Skill Level 3, Tank Turret Repairman
9-45L/CM	Commander's Manual, MOS 45L, Artillery Repairman
9-45L 1/2	Soldier's Manual, Skill Level 1/2, Artillery Repairman
9-63G/CM	Commander's Manual, MOS 63G, Fuel and Electric Systems Repairman
9-63G 1/2	Soldier's Manual, Skill Level 1/2 Fuel and Electric Systems Repairman
9-63H/CM	Commander's Manual, MOS 63H, Tracked Vehicle Repairman
9-63H 1/2	Soldier's Manual, Skill Level 1/2, Tracked Vehicle Repairman
9-63H 3	Soldier's Manual, Skill Level 3, Tracked Vehicle Repairman
9-63H 4	Soldier's Manual, Skill Level 4, Tracked Vehicle Repairman
9-63W/CM	Commander's Manual, MOS 63W, Wheeled Vehicle Repairman
9-63W 1/2	Soldier's Manual, Skill Level 1/2, Wheeled Vehicle Repairman
10-14	Unit and Organization Supply (Manual Procedures)
11-31E/CM	Commander's Manual, MOS 31E, Field Radio Repairer
11-31E 1/2	Soldier's Manual, Skill Level 1/2, Field Radio Repairer
20-22	Vehicle Recovery Operations
21-6	How to Prepare and Conduct Military Training

**NUMBER****TITLE****FIELD MANUALS (FM) (Continued)**

29-2	Organizational Maintenance Operations
29-30-1	Division Maintenance Battalion
29-35	Maintenance Support in Separate Brigades
29-50	Supply and Services in Divisions and Separate Brigades
38-1	Logistics Management
38-5	Logistics Maintenance Management
FM 42-Series	Maintenance and Repair Parts Consumption Planning Guide for Contingency Operations for:
42-5-3	Generator Set, 3KW
42-5-9	Generator Set, 60KW
42-5-10	AVLB
42-9-1	Tank, M60A1
42-9-2	Truck, 5 Ton, M800 Series
42-9-3	Truck, 5 Ton, M52 Series
42-9-4	Rifle, M16
42-9-5	Howitzer, M109A1
42-9-9	Carrier, M113A1
42-9-11	Truck, 2 1/2 Ton, M35 Series
42-9-12	Combat Engineer Vehicle, M728
42-9-14	Recovery Vehicle, M88
42-9-16	Truck, 1/4 Ton, M151
42-9-18	Mortar, 81mm
42-9-19	Machinegun, M60
42-9-21	Recovery Vehicle, M578
42-11-1	Radio Set, AN/PRC-77
42-11-6	Radio Set, AN/VRC-12 Series
43-1	Organizational Maintenance Management
43-2	Metalbody Repair and Allied Operations
100-10	Combat Service Support

**TRAINING CIRCULARS (TC)**

21-5-3	TEC Management and Maintenance Instructions
21-5-4	Catalog of Training Extension Course Lessons
21-5-7	Training Management in Battalions
21-5-9	Battalion TEC Handbook

**TECHNICAL MANUALS (TM's)**

5-674	Electric Motor and Generator Repair
9-237	Welding Theory and Application
9-1000-202-14	Evaluation of Cannon Tubes
9-1000-213-35	Cannon, M68; Mounts M116 and 140; Cupola, M19 (for M60)
9-1005-211-35	Pistol, cal. 45
9-1005-213-10	Machinegun, M2
9-1005-213-25	Machinegun, M2
9-1005-224-24	Machinegun, M60

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## TECHNICAL MANUALS (TM's) (Continued)

9-1005-231-10	Machinegun, M85
9-1005-231-25	Machinegun, M85
9-1005-233-24	Machinegun, M73, M219
9-1005-249-20	Rifle, M16
9-1005-249-34	Rifle, M16
9-1005-313-20	Machinegun, M240
9-1010-221-24	Launcher, M203
9-1015-200-34	Mortar, 81MM
9-1015-215-34	Mortar, 4.2 Inch
9-1220-203-34	Ballistic Computer, M13A1 (for M60)
9-1220-220-34	Ballistic Drive, M10 (for M60)
9-1240-239-35	Periscope, M28C (for M60)
9-1240-248-35	Sight, M44C (for M60)
9-1240-258-34	Range Finder, M17 (for M60)
9-1240-260-35	Periscope, M31 (for M60)
9-1240-262-34	Telescope, M105 (for M60)
9-1240-271-35	Mount, M118 (for M60)
9-1240-272-35	Mount, M119 (for M60)
9-1240-273-34	Mount, M145 (for M109)
9-1240-274-34	Telescope, M117 (for M109)
9-1240-275-34	Mount, M146 (for M109)
9-1240-276-34	Telescope, M118C (for M109)
9-1240-277-35	Periscope, M42 (for M109)
9-1240-285-35	Mount, M114 (for M60)
9-1240-286-35	Mount, M115 (for M60)
9-1240-287-34	Sight Unit, M53 (for Mortar)
9-1240-313-34	Periscope, M32 and Mount, M104 (for M60)
9-1240-314-34	Periscope, M36 (for M60)
9-1240-315-35	Periscope, M37 (for M60)
9-1240-322-35	Sight, 8635466 (for M60)
9-1240-324-34	Collimator, M1 (for M109)
9-1240-379-34	Periscope, M32 (for M60)
9-1290-200-14	Quadrant, M1 (for M109)
9-1290-232-35	Quadrant, M13 (for M60)
9-1290-262-35	Aiming Circle, M2
9-1290-263-34	Azimuth Indicator, M28A1 (for M60)
9-1290-322-35	Quadrant, M15
9-1290-329-34	Fuse Setter Set, M63 (for M109)
9-1290-333-15	Compass, M2
9-1290-347-34P	Aiming Post, M1 (for M109)
9-1580	Binocular, M3, M7, M8, M9, M13, M15, M16, M17
9-1590	Fuse Setter, M27 (for M109)
9-2300-224-10	Carrier, M113
9-2300-224-20	Carrier, M113
9-2300-224-34	Carrier, M113
9-2300-247-40	Tactical Wheeled Vehicles, Repair of Frames

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## TECHNICAL MANUALS (TM's) (Continued)

9-2300-257-10	Carrier, M113A1
9-2300-257-20	Carrier, M113A1
9-2300-257-34	Carrier, M113A1
9-2300-378-35/1	Tank, M60A1
9-2300-378-35/2	Tank, M60A1
9-2320-209-10	Truck, M35A2
9-2320-209-20	Truck, M35A2
9-2320-209-35	Truck, M35A2
9-2320-218-10	Truck, M151
9-2320-218-20	Truck, M151
9-2320-218-34	Truck, M151
9-2320-242-20	Truck, 1 1/4 Ton, M561 Series
9-2320-242-34	Truck, 1 1/4 Ton, M561 Series
9-2320-260-20	Truck, 5 Ton, M800 Series
9-2320-260-34/1	Truck, 5 Ton, M800 Series
9-2320-260-34/2	Truck, 5 Ton, M800 Series
9-2320-266-20	Truck, 1 1/4 Ton, M880 Series
9-2320-266-34	Truck, 1 1/4 Ton, M880 Series
9-2350-215-10	Tank, M60A1
9-2350-215-20	Tank, M60A1
9-2350-217-10	Howitzer, M109
9-2350-217-20	Howitzer, M109
9-2350-217-34/1	Howitzer, M109
9-2350-217-34/2	Howitzer, M109
9-2350-222-20	Combat Engineer Vehicle, M728
9-2350-222-35/2	Combat Engineer Vehicle, M728
9-2350-238-20	Recovery Vehicle, M578
9-2350-238-34/1	Recovery Vehicle, M578
9-2350-238-34/2	Recovery Vehicle, M578
9-2350-256-20	Recovery Vehicle, M88
9-2350-256-34/1	Recovery Vehicle, M88
9-2350-256-34/2	Recovery Vehicle, M88
9-2350-257-20/1	Tank, M60A1 (RISE)
9-2350-257-20/2	Tank, M60A1 (RISE)
9-2350-257-34/1	Tank, M60A1 (RISE)
9-2350-257-34/2	Tank M60A1 (RISE)
9-2520-223-34	Transmission, CD-850 (for M60)
9-2520-234-35	Transmission (for M109)
9-2520-236-34	Transmission, Allison (for M113)
9-2520-246-35	Transmission, Transfers, and Power Takeoffs (for M35A2)
9-2520-254-34	Transmission, Allison (for M113)
9-2805-206-35	Engine, AVSI 1790 (for M88)
9-2815-200-35	Engine, AVDS-1790 (for M60)
9-2815-202-34	Engine, Diesel 8V71T (for M109)
9-2815-205-34	Engine, Diesel 6V53T (for M113A1)
9-2815-210-35	Engine, Diesel (Multifuel) (for M35 Series)

**NUMBER****TITLE****TECHNICAL MANUALS (TM's) (Continued)**

9-2815-220-34	Engine, AVDS 1790 (for M60)
9-2910-212-34	Fuel Injection Pump
9-2920-224-35	Generator, 300 Amp
9-2920-225-34	Generator/Alternator, 100 Amp
9-2920-242-35	Starter
9-2920-247-34	Generator, 25 Amp
9-2920-248-35	Starter
9-2920-252-34+P	Generator, 650 Amp and Voltage Regulator
9-4910-485-12	Test Stand for Generator, Alternator, Starter
9-4933-200-35	Pullover Gages and Borescopes
9-6015	Light, M14 (for M109)
9-6650-215-34	Binocular, M18
9-6650-216-34	Periscope, M24 (for M60)
9-6650-217-34	Periscope, M19 (for M113)
11-600-2	Communications-Electronics Fundamentals
11-668	FM Transmitters and Receivers
11-681	Electrical Fundamentals (Alternating Current)
11-5805-201-12	Telephone Set, TA-312
11-5805-201-35	Telephone Set, TA-312
11-5820-401-12	Radio Set, AN/VRC 12
11-5820-401-30-4	Amplifier, AM-1780/VRC
11-5820-401-34-2	Radio Set, AN/VRC 12
11-5820-401-34-3	Radio Receiver, R-442
11-5820-401-35-1	Control Set, C-2299/VRC
11-5820-401-35-4	Amplifier, AM-1780/VRC
11-5820-401-35-6	Control Set, C-2296/VRC
11-5820-401-35-7	Control Set, C-2297/VRC
11-5820-401-35-8	Control Set, C-2298/VRC
11-5820-477-12	Control Group, AN/GRA 39
11-5820-477-35	Control Group, AN/GRA 39
11-5820-677-12	Radio Set, AN/PRC-77
11-5820-677-35	Radio Set, AN/PRC-77
11-5830-340-12	Amplifier, AM-1780/VRC
11-6130-233-12	Power Supply, PP-2953/U
11-6130-233-35	Power Supply, PP-2953/U
11-6625-200-15	Multimeter, ME-26A/U
11-6625-255-14	Spectrum Analyzer, TS-723/U
11-6625-320-12	Voltmeter, ME-30/U
11-6625-366-15	Multimeter, TS-352/U
11-6625-446-15	Wattmeter, AN/URM-120
11-6625-524-14-2	Voltmeter, AN/URM-145
11-6625-586-12	Signal Generator, AN/URM-103

**NUMBER****TITLE****TECHNICAL MANUALS (TM's) (Continued)**

11-6625-700-10	Electronic Counter, AN/USM-207
11-6625-1703-15	Oscilloscope, AN/USM 281A
11-6625-2725-14	Signal Generator, AN/URM-127A
38-750	The Army Maintenance Management System (TAMMS)
38-750-1	Maintenance Management, Field Command Procedures
750-116	Purging and Charging of Fire Control Instruments
750-254	Cooling Systems

**TECHNICAL BULLETINS (TB)**

SIG-222	Solder and Soldering
9-2320-247-40	Tactical Wheeled Vehicles, Repair of Frames
9-6625-961-35	Multimeter, AN/USM210

**TRAINING EXTENSION COURSE (TEC) LESSONS**

101-113-4701	Test-Operating Communications-Electronics Equipment
101-113-4702	Testing Power Supplies
101-113-4705	Testing Resistors
101-113-4708	Testing Semiconductor Devices with an Ohmmeter
101-113-4711	Testing Capacitors and Transformers with Ohmmeter
101-113-4714	Locating Faults in Power Supplies, Part 1
101-113-4715	Locating Faults in Power Supplies, Part 2
101-113-4717	Testing Receiver Audio Circuits
101-113-4720	Testing Receiver IF Circuits
101-113-4723	Testing Receiver RF Circuits
101-113-4726	Identifying Faulty Audio Stage
101-113-4728	Identifying Faulty IF or Detector Stage
101-113-4732	Checking Bias Voltages
101-113-4735	Locating Receiver Audio Circuit Faults
101-113-4738	Locating Receiver IF and Detector Circuit Faults
101-113-4741	Locating Receiver RF Circuit Faults
101-113-4744	Troubleshooting Receiver Circuits
101-113-4747	Testing Transmitter Oscillator and Buffer Stages
101-113-4750	Testing Transmitter Doubler and Output Circuits
101-113-4753	Testing Transmitter Modulator Circuits
101-113-4756	Locating Transmitter Oscillator and Buffer Faults
101-113-4759	Locating Transmitter Doubler & Output Circuit Fault
101-113-4762	Locating Transmitter Modulator Circuit Faults
101-113-4765	Troubleshooting Transmitter Circuits
101-113-4768	Troubleshooting Communications-Electronic Equipment
101-113-4771	Aligning Receiver Circuits
101-113-4772	Aligning Transmitter Circuits
101-113-4773	Testing the Transmitter Using the Oscilloscope
101-113-4775	Multimeter TS-352 Part 1 (Measuring Resistance)
101-113-4776	Multimeter TS-352 Part 2 (Measuring Voltage)

**NUMBER****TITLE****TRAINING EXTENSION COURSE (TEC) LESSONS (Continued)**

101-113-4777	Multimeter TS-352 Part 3 (Measuring Current)
101-113-4778	Multimeter ME26U: Measuring Resistance
101-113-4779	Multimeter ME26U: Measuring DC Voltage
101-113-4780	Multimeter ME26U: Measuring AC Voltage
101-113-7120	Troubleshoot Radio Sets, AN/GRC-160 and AN/PRC-77
101-113-7144	Install AN/VRC-12
101-113-7145	Test, Operate AN/VRC-12
101-113-7147	System Troubleshoot AN/VRC-12
101-113-7155	Replace BNC Connector on AN/VRC-12 Cable
101-113-7164	Test Modules in an AN/VRC-12
101-113-7167	Systems Troubleshoot AN/GRA-39
101-113-7176	Measure Resistance Utilizing AN/USM 223
101-113-7177	Measure Voltage, Pt. II, Using AN/USM 223
101-113-7178	Measure Current, Pt. III, Using AN/USM 223
510-091-4682	Preparing and Maintaining DA Form 2405
510-091-6456	Preparing and Using DA Form 2404
510-091-6457	Preparing and Using DA Form 2404
510-091-6458	Preparing and Maintaining ESC Test and Checks
510-091-6459	Preparing, Maintaining, and Using DA Form 2407, Part 1
510-091-6460	Preparing, Maintaining, and Using DA Form 2407, Part 2
510-091-6461	Preparing, Maintaining, and Using DA Form 2407, Part 3
510-091-6462	Preparing, Maintaining, and Using DA Form 2407, Part 4
510-091-6464	Preparing, Maintaining, and Using DD Form 314
510-091-6465	Preparing, Maintaining, and Using DD Form 314
510-091-6467	Preparing and Consolidating DA Form 2406
510-091-6468	Preparing and Consolidating DA Form 2406
510-091-6472	Preparing, Consolidating, and Maintaining DA Form 2408-1
510-091-6474	Preparing, Maintaining, and Using DA Form 2408-14
510-091-6478	Preparing, Maintaining, and Using DA Form 2408-5
551-101-7902	Issue PLL Items and Request Replacement
610-091-6051	Battery/Antifreeze Tester
610-091-6052	Battery Hydrometer
610-091-6053	Low Voltage Circuit Tester
610-091-6054	Battery System
610-091-6056	Troubleshooting the Starting System, Part 1
610-091-6057	Troubleshooting the Starting System, Part 2
610-091-6060	Test Generator Output
610-091-6061	Test Reverse Current Relay
610-091-6062	Test Voltage Regulator
610-091-6065	Test, Adjust Output—60 Amp System
610-091-6066	Load Test 60 Amp Alternator
610-091-6068	Troubleshoot Ignition System, Part 1
610-091-6069	Troubleshoot Ignition System, part 2
610-091-6070	Install, Time Ignition Distributor

**NUMBER****TITLE****TRAINING EXTENSION COURSE (TEC) LESSONS (Continued)**

610-091-6077	Test, Analyze Cylinder Compression
610-091-6078	Test and Analyze Manifold Vacuum
610-091-6086	Clutches
610-091-6088	Steering
610-091-6251	Multifuel Engine Fuel System
610-091-6252	Multifuel Engine Fuel System
610-091-6253	Multifuel Engine Fuel System
610-091-6259	Troubleshoot Fuel, Air, Exhaust Systems
610-091-6260	Analyze Exhaust Smoke of Diesel Engines
610-091-6261	Locate Dead Cylinder
610-091-6262	Inspect, Repair Air Intake, Exhaust
610-091-6263	Inspect Fuel System of Diesel Engine
610-091-6264	Perform Fuel Flow Test of Diesel Engine
610-091-6265	Remove and Install an Injector
610-091-6266	Test Cylinder Compression, Diesel Engine
610-091-6267	Adjust Valve Clearance, Diesel Engines
610-091-6268	Time Fuel Injectors
610-091-6269	Adjust Governor Gap, Diesel Engine
610-091-6270	Adjust Injector Racks
610-091-6271	Adjust No-Load, Idle and Buffer Screw
611-091-6101	Test and Adjust Generator Output of M60 Tank
611-091-6102	Troubleshoot Air Cleaner Blower on M60 Tank
611-091-6103	CD850 Transmission
611-091-6104	CD850 Transmission
611-091-6105	CD850 Transmission
611-091-6106	CD850 Transmission
611-091-6108	SP Artillery Brakes
611-091-6109	M60A1 Tank Brakes
611-091-6110	M60A1 Tank Brakes
642-091-5801	Troubleshooting Gun Traverse and Elevation Control Circuit
643-091-5706	Prepare Gun Tube, Borescope, Evaluate
643-091-5707	Cannon Bore and Powderchamber Evaluation
643-091-5708	Measuring and Evaluating Gun Tube Wear
662-051-7607	Starting and Stopping the GED Generator Set
662-051-7608	Loading the GED Generator Set
670-091-5253	Infinity Sight



**NUMBER****TITLE****VIDEO TAPE RECORDINGS (VTR's)**

4E-091-0176	Disassembly and Assembly of Recoil Mechanism, M60 Tank
4N-091-0205	Disassembly of 10-KW and 3-KW Generators
101-113-0036	Oscilloscope 05-3C: How to Display Wave Forms
101-113-0038	Audio Oscillator TS-332D/U: How to Generate Audio Frequency Signals
101-113-0039	Audio Oscillator TS-38D/U: How to Apply Audio Frequency Test Signals to a Radio Receiver
101-113-0042	Electronic Voltmeter ME-30/U: How to Measure Decibels
101-113-0047	Signal Generator AN/URM-103: How to Apply IF Signals to a Radio Receiver
101-113-0049	Electronic Voltmeter AN/URM-145: Getting Acquainted
101-113-0051	Electronic Voltmeter AN/URM-145: How to Measure Decibels
101-113-0052	Electronic Voltmeter AN/URM-145: How to Convert Voltage and Decibel Readings
101-113-0058	Oscilloscope AN/USM-281A: How to Measure the Percentage Modulation of AF Outputs
101-113-0059	Oscilloscope AN/USM-281A: How to Develop a Horizontal Trace
101-113-0074	Troubleshooting Procedures for Receiver Power Supply
101-113-0075	Troubleshooting Procedures for Receiver Audio Amplifiers
101-113-0076	Troubleshooting Procedures for Receiver, Detector, AVC and IF Amplifier
101-113-0077	Troubleshooting Procedures for Receiver R-F Section
101-113-0078	General Troubleshooting Procedures for the Trainer Receiver
101-113-0079	Sectionalizing Troubles in the Receiver Trainer
101-113-0085	Series: Test Instruments for Radio Repairman, Multimeter ME-26
101-113-0086	Series: Test Instruments for Radio Repairman, Basic Applications
101-113-0087	Series: Test Instruments for Radio Repairman: Multimeter ME-30
101-113-0088	Series: Test Instruments for Radio Repairman: An/URM-25 Signal Generator
101-113-0089	Series: Test Instruments for Radio Repairman: SIG-12 Signal Generator
101-113-0091	Spectrum Analyzer TS-723/U: Getting Acquainted
101-113-0092	Spectrum Analyzer TS-723/U: How to Measure Distortion
101-113-0093	Spectrum Analyzer TS-723/U: How to Measure Voltage
101-113-0094	Spectrum Analyzer TS-723/U: How to Interpolate Readings
101-113-0095	Spectrum Analyzer TS-723/U: How to Compute Signal-to-Noise Ratios
101-113-0096	Electronic Counter AN/USM-207- Getting Acquainted
101-113-0097	Electronic Counter AN/USM-207- How to Read the Frequency of Radio Signal

**NUMBER****TITLE****VIDEO TAPE RECORDINGS (VTR's) (Continued)**

101-113-0098	Frequency Meter AN/USM-159- Getting Acquainted
101-113-0099	How to Use the AN/USM-159- As a Signal Generator
101-113-0100	Frequency Meter AN/USM-159, How to Use
101-113-0101	Signal Generator AN/GRM-50-: Getting Acquainted
101-113-0102	Signal Generator AN/GRM-50: How to Generate RF Signals
101-113-0103	Signal Generator AN/GRM-50: How to Apply Test Signals
101-113-0104	Signal Generator AN/URM-127: Getting Acquainted
101-113-0105	Signal Generator AN/URM-127: How to Set up and Apply AF Signals
101-113-0106	Multimeter ME-26D: Getting Acquainted
101-113-0107	Multimeter ME-26D: How to Measure Resistance
101-113-0108	Multimeter ME-26D: How to Measure AC Voltage
101-113-0109	Multimeter ME-26D: How to Measure DC Voltage
101-113-0110	Signal Generator AN/URM-48: Getting Acquainted
101-113-0112	Signal Generator AN/URM-48: How to Apply RF Signals
101-113-0113	Signal Generator AN/URM-25F: Getting Acquainted
101-113-0114	Signal Generator AN/URM-25F: How to Generate RF Signals
101-113-0115	Signal Generator AN/URM-25F: How to Apply RF Signals
101-113-0116	Output Meter TS-585C: How to Measure the AF Output Levels
101-113-0117	Output Meter TS-585C: How To Measure the AF Output Levels
101-113-0118	Dummy Load Group OA-4539: Getting Acquainted
101-113-0618	Audio Oscillator TS-382D/U: Getting Acquainted
101-113-0619	Audio Oscillator TS-382D/U: How to Generate Audio Frequency Signals
101-113-0620	Audio Oscillator TS-382 D/U: How to Apply Audio Frequency Signals to a Radio Receiver
101-113-0621	Electronic Voltmeter ME-30/U: Getting Acquainted
101-113-0622	Electronic Voltmeter ME-30/U: How to Measure AC Voltage
101-113-0623	Electronic Voltmeter ME-30/U: How to Measure Decibels
101-113-0624	Electronic Voltmeter ME-30/U: How to Convert Voltage and Decibel Readings
101-113-0625	Signal Generator AN/URM-103: Getting Acquainted
101-113-0626	Signal Generator AN/URM-103: How to Generate IF Signals
101-113-0627	Signal Generator AN/URM-103: How to Generate RF Signals
101-113-0628	Signal Generator AN/URM 103: How to Apply RF Signals to a Radio Receiver
101-113-0630	Electronic Voltmeter AN/URM-143, Getting Acquainted
101-113-0631	Electronic Voltmeter AN/URM-143, How to Measure AC Voltage
101-113-0632	Electronic Voltmeter AN/URM-143, How to Measure Decibels
101-113-0633	Electronic Voltmeter AN/URM-143, How to Convert Voltage and Decibel Readings
101-113-0634	Oscilloscope AN/USM-281A: Getting Acquainted

**NUMBER****TITLE****VIDEO TAPE RECORDINGS (VTR's) (Continued)**

101-113-0635	Oscilloscope AN/USM-281A: How to Calibrate the Oscilloscope
101-113-0636	Oscilloscope AN/USM-281A: How to Measure Voltage
101-113-1646	Alignment of the Audio Circuits RT-246/VRC
101-113-1648	Alignment of the Serve System RT-246/VRC
101-113-1649	Alignment of Driver Stage RT-246/VRC
101-113-1650	Alignment of the Power Amplifier RT-246/VRC
101-113-1652	Troubleshooting the Transmit Path of the RT-662
101-113-1653	Troubleshooting the Receive Path of the RT-662
191-113-0008	Principles of Electricity: The Electron Theory
191-113-0014	Principles of Electricity: Series Circuits
191-113-0015	Principles of Electricity: Parallel Circuits
191-113-0016	Principles of Electricity: Series Parallel Circuits
191-113-0018	Principles of Electricity: Transformers
191-113-0019	Principles of Electricity: Inductance
610-091-0071	Magneto Test Stand
610-091-0085	Tracked Vehicle Charging System Testing
610-091-0096	Distributor Tester
610-091-0112	Testing the Starter Motor
610-091-0122	Timing Injector Pump
610-091-0124	Test 300 Amp Auxillary Generator Control Box
610-091-0208	Vacuum Press Gauge
610-091-0400	Battery Charging Introduction to Fuel Injector Test Stand
610-091-0575	Personnel Heater Testing
610-091-0576	Testing the 300 Amp Auxiliary Generator Control Box, Part 1
610-091-0577	400 Amp Control Box Testing on 500 Amp Test Stand, Part 1
610-091-0578	Amp T/V Generator Testing on 500 Amp Test Stand
610-091-0579	100 Amp Solid State Regulator Test on 500 Amp Test Stand
610-091-0580	25 Amp Generator Test on 500 Amp Test Stand
610-091-0581	400 Amp Control Box Testing, Part 2
610-091-0604	Testing the 300 Amp Auxiliary Generator Control Box, Part 2
610-091-0626	Introduction to Generator Principles
610-091-0637	Testing Starter Motor on the 500 Amp Test Stand
610-091-0645	Maintenance and Use of Meter
610-091-0653	Calibration of PSB12BT Injector Pump
610-0091-0654	Principles of Operation, PSB12BT Injector Pump
610-091-0655	Adjustment of Unit Injector System 8V71T Engine
610-091-0656	Timing Delivery Valve and Leakage Tests, PSB12BT Injector Pump
610-091-0787	Operation of Voltage Regulator, 400 Amp Control Box
610-091-0795	Interpretation of Meter Readings, TS-352

**NUMBER****TITLE****VIDEO TAPE RECORDINGS (VTR's) (Continued)**

610-091-0905	Removal and Installation of Propeller Shafts and Universal Joints, M151 Series Truck
641-091-0103	Gage and Inspection of M16A1 Rifle
641-091-0141	Gage Inspection of M16A1 Rifle
641-091-0477	Levels of Maintenance, M16A1 Rifle
642-091-0155	Charging Manual Elevation System, M109 Howitzer
643-091-0004	Installation of Traversing Mechanism, M60 Tank
643-091-0148	Charging of the Manual Accumulator, M60 Tank
643-091-0156	Gun and Mount Removal, 105MM Gun
643-091-0164	Tube Quick Change, 105MM Gun
643-091-0180	Disassembly and Assembly of Replenisher, M60 Tank
643-091-0181	Adjustment of Equilibrator, M19 Cupola
643-091-0451	Tank Turret Inspection, M60 Tank
670-091-0042	M13 Series Ballistic Computers
670-091-0220	M18 Binoculars

**VISUAL AIDS**

5-3-1	Management Improvement Techniques (see DA Pam 5-3-1, Chapter 3)
61-1	Work Simplification

**TRAINING FILMS**

20-5233d	Changing Attitudes Through Communications
20-5235	Zero Defects--Right the First Time (QA)
38-5158	The Case of John Erroneous (ZD)
61-30	Examining the Will to Work
61-5277a	Understanding Motivation
61-5277b	Motivation Through Job Enrichment
61-5349	Work Measurement Works
61-5521	Work Distribution Chart
61-5526	There is No End to Improvement
61-5718	Better Ways for Doing Work
61-5719	Who Does What to What?
61-5720	Roadmap to Less Effort (Work Flow)
61-5721	Counting What Counts (Work Standards)
61-5722	Make Fewer Motions (Motion Economy)
61-5723	Take Fewer Steps
61-5724	Where Do We Go From Here? (Motivation)
61-7768	Improving the Job

**CORRESPONDENCE SUB-COURSES**

IN0001	NCO Leadership and Career Development
ISO210	Methods of Instruction
ISO246	Military Leadership (Advanced)

**NUMBER****TITLE****CORRESPONDENCE SUB-COURSES (Continued)**

ISO257	Orientation of Management Practices in TOE/TDA Units
ISO269	Division Maintenance Operations
ISO275	Individual and Group Communication
ODO004	Tank Turret Materiel
ODO005	Wheeled Vehicle Power Train Principles
ODO010	Electrical System Component Repair
ODO011	Chassis Components Repair
ODO062	Advanced NCO Course Maintenance Subjects
ODO081	Wheeled Vehicle Steering Systems
ODO082	Tracked Vehicle Electrical Systems
ODO085	Tracked Vehicle Suspension Systems
ODO090	Light Tracked Vehicle Transmissions
ODO098	Fundamentals of Electricity
ODO099	Basic Electronics
ODO102	Turret Artillery, Tanks M60 and M60A1
ODO103	Self-Propelled Artillery
ODO105	Fire Control Materiel
ODO402	Maintenance of Multifuel Engine Assemblies
ODO403	Principles of Fuels and Fuel Systems
ODO404	Wheeled Vehicle Ignition and Electrical Systems
ODO405	Wheeled Vehicle Power Train Principles
ODO406	Wheeled Vehicle Engine Maintenance
ODO410	Wheeled Vehicle Brake Systems
ODO411	Machineguns
ODO412	Tracked Vehicle Engines (Compression Ignition)
ODO413	Hand and Shoulder Weapons
ODO416	Mortars
ODO420	Medium Tracked Vehicle Transmissions
ODO424	Machine Shop Practice
ODO425	Welding
ODO426	Allied Trades
ODO505	Elements of Management
ODO530	Principles of Military Vehicles
ODO531	Mechanical Maintenance of Tactical Wheeled and Tracked Vehicles
ODO605	Principles of Small Arms
ODO606	Armament Principles
ODO607	Engine Principles
ODO720	Maintenance Management and Supply Procedures I
ODO721	Maintenance Management and Supply Procedures II
ODO724	Armament Materiel
ODO726	Military Vehicles and Engines (Internal Combustion Engines)
ODO727	Electrical Systems and Components
ODO729	Tracked Vehicle Maintenance
ODO730	Wheeled Vehicle Maintenance

**NUMBER****TITLE****CORRESPONDENCE SUB-COURSES (Continued)**

ODO820	Training
ODO824	Combat Service Support in the Theater of Operations
ODO834	Military Publications (Basic)
ODO838	DS Unit Supply Operations
ODO839	Maintenance Management (Mission)
ODO840	General Management
ODO907	Communicative Arts
ODO910	Military Management
ODO914	Maintenance Management I
ODO915	Maintenance Management II
ODO917	Army Materiel Preventive Maintenance I
ODO920	Supply Management I
ODO926	Combat Service Support
HB6301	Introduction to Wheeled Vehicle Maintenance
HB6302	Wheeled Vehicle Engines
HB6303	Wheeled Vehicle Electrical Systems
HB6304	Wheeled Vehicle Fuel and Exhaust Systems
HB6305	Wheeled Vehicle Clutches, Transmissions, and Transfers
HB6306	Wheeled Vehicle Drive Lines, Axles, and Suspension Systems
HB6307	Wheeled Vehicle Steering Systems
HB6308	Wheeled Vehicle Braking Systems
HB6309	Maintenance Procedures
HC6301	Introduction to Tracked Vehicle Maintenance
HK4501	Introduction to Tank Turret Maintenance
HK4502	Fundamentals of Tank Turret Components and Systems
HK4503	Introduction to 105-mm Gun Tank M60A1 Turret
HK4504	Maintenance of 105-mm Gun Tank M60A1 Turret
HK4506	Combat Engineer Vehicle Turret
HL4501	Introduction to Artillery Maintenance
HL4502	Fundamentals of Artillery Systems and Components
HL4507	Medium Self-Propelled Artillery Maintenance
RC1007	Shop Area Layout
RC1011	Preparation of Maintenance
RC1016	Training Techniques
RC1018	Maintenance Training Program
RC1019	Group Training Techniques
SM1092	Using the LVCT to Test Batteries Under Load
SS0302	Magnetism and Electromagnetism
SS0303	Electrical Fundamentals--AC
SS0304	Electrical Networks
SS0308	Introduction to Electricity
SS0309	Introduction to Electronics
SS0311	Electron Tubes
SS0312	Electron-Tube Applications
SS0313	Semiconductor Devices

**NUMBER****TITLE****CORRESPONDENCE SUB-COURSES (Continued)**

SS0314	Semiconductor Applications
SS0315	Power Transistors
SS0320	Communications Fundamentals
SS0321	AM Radio Transmitters
SS0322	AM Radio Receivers
SS0323	FM Radio Transmitters
SS0324	FM Radio Receivers
SS0325	Radio Wave Propagation
SS0327	Frequency Synthesis
SS9443	Voltmeter ME-30/U
SS9444	Signal Generator AN/URM-127
SS9445	Signal Generator AN/URM-103
SS9446	Electronic Counter AN/USM-207
SS9447	Electronic Counter, AN/USM-207
SS9448	Multimeter TS-352/U
SS9449	Multimeter ME-26/U
SS9709	Oscilloscope AN/USM-281A
SS9713	DS Troubleshooting of Receiver-Transmitter Radio RT-246/VRC and RT-524/VRC

**DA POSTERS**

750-50	Low Voltage Circuit Tester
750-51	Spark Plug Cleaner/Tester
750-52	Optical Antifreeze/Battery Tester
750-53	Multimeter (TS-352 B/U)
750-54	Battery Tester (AN/PSM-13)
750-55	Multimeter (AN/URM-105)
750-56	Vacuum Gage
750-57	Timing Light
750-58	Tach-Dwell Test Set
750-59	Compression Gage

**SKILL PERFORMANCE AIDS (SPAs)**

610-091-9054-Y	M60 Series Tank ETM Training Package (63G)
610-091-9055-V	Student Guide (63G)
610-091-9055-Y	Training Manager's Guide (63G)
610-091-9056-S	Use of -34 Manuals
610-091-9060-Y	M60 Series Tank ETM Training Package (63H)
610-091-9061-V	Student Guide (63H)
610-091-9061-Y	Training Manager's Guide (63H)
610-091-9062-H	Steering Control Linkage Repair (M60)
610-091-9063-H	Shifting Controls and Linkage Repair (M60)
610-091-9066-H	Engine Replacement (M60)
610-091-9200-H	Troubleshooting the Fuel and Electrical Systems (M809)

**NUMBER****TITLE****SKILL PERFORMANCE AIDS (SPAs) (Continued)**

610-091-9204-H	Repairing the Steering Gear Assembly (M809)
610-091-9205-H	Replacing Seals in the Transfer Assembly (M809)
610-091-9231-H	Repairing the Fuel Injectors, Part I (M809)
610-091-9232-H	Repairing the Fuel Injectors, Part II (M809)
610-091-9252-H	Removing, Inspecting and Replacing the Clutch (M561)
610-091-9253-H	Adjusting the Governor and Injector Rack Control (M561)
610-091-9254-H	Removing and Disassembling the Articulation Yoke (M561)
610-091-9255-H	Assembling and Installing the Articulation Yoke (M561)
610-091-9261-H	Removing and Replacing Differential Propeller Shaft Seals (M561)
610-091-9264-Y	M561 Truck ETM Training Package
610-091-9265-V	Student Guide (M561)
610-091-9265-Y	Training Manager's Guide (M561)
610-091-9270-Y	M809 Truck ETM Training Package
610-091-9271-V	Student Guide (M809)
610-091-9271-Y	Training Manager's Guide (M809)
670-091-9000-R	Job Performance Guide (41C)
670-091-9001-H	M13 Series Ballistic Computer
670-091-9001-V	Student Guide (41C)
670-091-9001-Y	Training Manager's Guide (41C)
670-091-9002-Y	M60 Series Tank Turret ETM Training Package (41C)
670-091-9003-H	M17 Series Rangefinder
670-091-9004-H	M24 Periscope
670-091-9005-H	M24 Periscope
670-091-9006-H	M36 Periscope
670-091-9007-H	M119 Periscope
670-091-9010-H	M13 Series Elevation Quadrant
811-091-9100-L	Using the Skill Performance Aids System